P 19/4

United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department
of Agriculture, Forest
Service; United States
Department of the
Interior, Bureau of Land
Management and
National Park Service;
and Utah Agricultural
Experiment Station

Soil Survey of Panguitch Area, Utah,

Parts of Garfield, Iron, Kane, and Piute Counties

A 57.38:

How To Use This Soil Survey

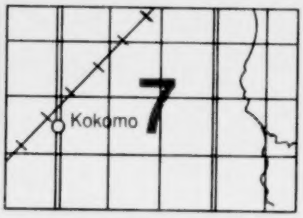
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

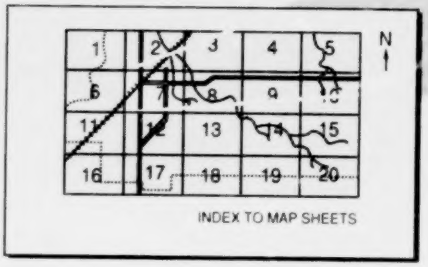
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

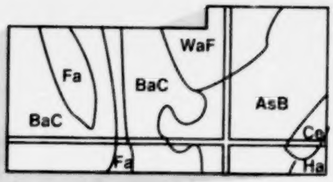
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1979. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service, Forest Service, Bureau of Land Management, National Park Service, and Utah Agricultural Experiment Station. It is part of the technical assistance furnished to the Upper Sevier and Canyonlands Soil Conservation Districts.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Typical area of soils in the drainageway of the East Fork Sevier River, on Paunsaugunt Plateau. Kade soils on bottom land; Sevier soils at lower center; and Pahreah and Swapps soils in background.

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Foreword

This soil survey contains information that can be used in land-planning programs in Panguitch Area, Utah. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Francis T. Holt
State Conservationist
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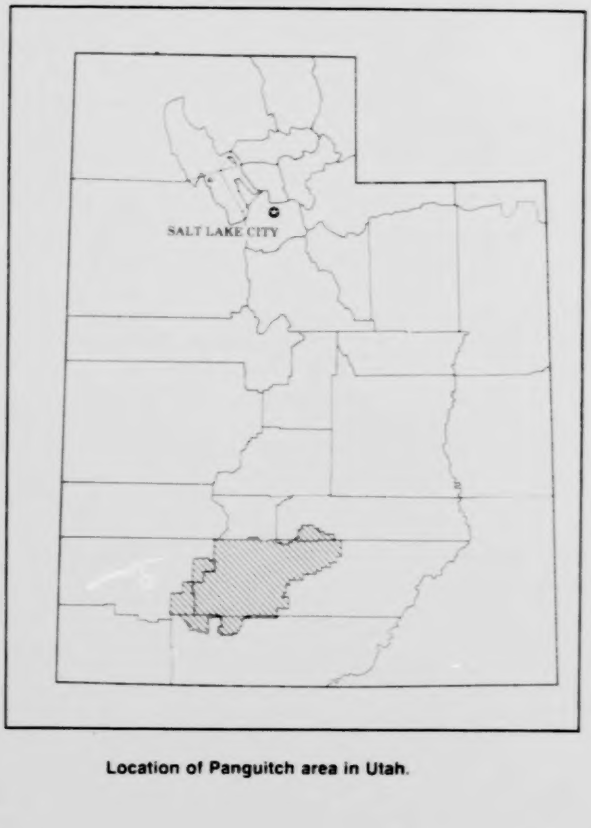

Location of Panguitch area in Utah.

Soil Survey of
Panguitch Area, Utah,
Parts of Garfield, Iron, Kane, and Piute Counties

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Forest Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
United States Department of Agriculture, Forest Service; United States Department of the
Interior, Bureau of Land Management and National Park Service; and Utah Agricultural
Experiment Station

This survey area is in the south-central part of Utah. It has a total area of 881,482 acres, or about 1,377 square miles. Elevation ranges from 6,000 feet near Henrieville to 11,036 feet on Mount Dutton. The population of the survey area is about 3,700. Panguitch, the county seat, is the largest town in the survey area and has a population of about 1,300. Other towns in the survey area include Tropic, Cannonville, Henrieville, Hatch, Escalante, Boulder, and Antimony.

Bryce Canyon National Park is a major recreation and scenic area in the survey area. The park usually attracts more than 500,000 visitors annually *(7)*. Several tourist facilities located outside the park provide lodging, meals, groceries, souvenirs, and gasoline. Complete tourist facilities are also available inside the park.

U.S. Highway 89 runs north and south through Panguitch Valley and is the major road system in the survey area. State Road 12 runs east and west and serves the towns of Boulder, Escalante, Henrieville, Cannonville, and Tropic. It also provides access to Bryce Canyon National Park. The Johns Valley Road serves the farmers and ranchers between Antimony and Bryce Canyon Junction.

Three small airports serve the survey area; these are at Panguitch, Escalante, and just north of Bryce Canyon National Park.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent survey areas. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey.

General Nature of the Survey Area

This section briefly discusses the history and development; natural resources; water supply; agriculture; physiography, relief, and drainage; and climate of the survey area.

History and Development

The first exploration party to pass through the survey area consisted of Mormon pioneers. They passed through the area in 1852 but did not attempt to form a settlement at that time. It was not until 1864 that a Mormon expedition from the towns of Beaver and Parowan formed a settlement in the area that is now known as the town of Panguitch. After only 2 years the settlers were forced to leave following many skirmishes with Indians *(7)*.

In 1870 the Panguitch area was again considered safe for settlement, and in March of 1871 Mormon pioneers moved back to Panguitch. When they returned they found that the Indians had not touched the homes or crops of the previous settlers.

In 1872 a group of these early settlers set out to find more fertile farm soils. They went east from Panguitch to an area that was then known as Potato Valley but was later changed to Escalante in honor of Father Escalante, an early Spanish monk who had explored a large part of Utah. The settlers named the area after Escalante even though he probably never explored this part of Utah.

Northeast of Escalante lies the town of Boulder. Boulder was truly one of America's "last frontiers." It was not until the 1930's that the civilian Conservation Corps built the first road from Escalante to Boulder. Previous to that time, all supplies were taken to Boulder by packhorse or mule train.

Natural Resources

Soil, water, and minerals are important natural resources in the survey area. Soil and water are the most important and widely used resources. They are renewable resources, and with careful use and management their value can be maintained or even improved.

The Sevier River, the Escalante River, Boulder Creek, Panguitch Creek, the East Fork of the Sevier River, and the Paria River and their tributaries are the main sources of irrigation water in the survey area. Tropic Reservoir, Panguitch Reservoir, Wide Hollow Reservoir, and several small lakes and other small reservoirs provide recreation, stock water, flood control, and irrigation water.

Mineral resources in the survey area include deposits of gravel, coal, and oil. Sand and gravel deposits are abundant along the major rivers in the survey area and are used mainly for road construction and maintenance. Oil drilling and exploration have been quite active in past years but have been reduced in recent times because of poor economic conditions. Large coal deposits have been discovered and explored in the Tropic, Cannonville, and Henrieville areas of the survey area, but at the present time there are no commercial coal mines in the area. Some mining of basalt and volcanic ash for use in landscaping is done in the southern part of the area.

Commercial timber resources on the Paunsaugunt Plateau have made important contributions to the local economy for more than 30 years. Most logging has been done in the ponderosa pine and mixed conifer areas in the East Fork of the Sevier River and Kanab Creek areas in the Dixie National Forest, next to Bryce Canyon National Park. Lumber is milled in Panguitch. A relatively small area of commercial mixed conifer and Engelmann spruce timber grows in the vicinity of Mount Dutton. Timber harvesting in this area has been sporadic because of the long haul route through Antimony. Average annual timber production in the survey area in recent years has been about four million board feet.

Water Supply

The Sevier River, the Escalante River, Panguitch Creek, Boulder Creek, the East Fork of the Sevier River, and the Paria River and their tributaries are the major sources of surface water in the survey area. These streams are fed mainly by snowmelt and ground water discharge from nearby mountains.

Rainfall in the survey area is not adequate for the most commonly grown crops; therefore, supplemental irrigation is required to obtain acceptable crop yields.

Most irrigation water for the survey area is diverted from the rivers and streams. Tropic Reservoir, Wide Hollow Reservoir, and Panguitch Lake are the only major irrigation reservoirs in the area. Many small reservoirs have been built in the area; they are used mainly for water regulation rather than storage.

Several irrigation companies in the survey area have converted from furrow and flood irrigation to gravity and pressurized sprinkler systems. This conversion is an attempt to increase irrigation efficiency, to increase crop production, and to help eliminate the late-season water shortages that occur in most of the survey area.

In some areas well water, or water collected from springs and seeps and water in ponds, is distributed by pipeline to help prevent livestock from grazing in one area.

Agriculture

A large part of the survey area is used for agriculture, most of which is used for livestock grazing. Beef cattle account for most of the value of agricultural products sold.

Because of the short growing season in much of the survey area—70 to 100 days—the agricultural industry has been centered around the raising of livestock. The cold temperatures and short growing season limit the growth of many commercial crops in the Panguitch and Johns Valley areas. Native grasses, alfalfa hay, and some small grain crops are grown and are used mainly for winter feed for livestock. The warmer climate in the Tropic, Cannonville, Henrieville, and Escalante areas permits the raising of some small fruit and other commercial crops.

Large areas of Johns Valley were used as nonirrigated cropland during early settlement times. The town of Widtsoe at one time had a school and post office; however, the precipitation was too low for commercial crop production, and eventually all the nonirrigated farms were abandoned and the settlement of Widtsoe became a "ghost town."

The Canyonlands Soil Conservation District was organized on June 6, 1966, and the Upper Sevier Soil Conservation District was organized on November 19, 1941. These districts were organized to help farmers and ranchers solve their soil and water conservation problems.

Physiography, Relief, and Drainage

The survey area is on the western edge of the Colorado Plateaus physiographic province. The area has seven distinct physiographic areas. They include parts of the Markagunt Plateau, Sevier Valley, Sevier Plateau, Paunsaugunt Plateau, Johns Valley, Tropic Amphitheater, and Kaiparowits Plateau *(8)*.

The Markagunt Plateau lies along the western border of Garfield County. It is characterized by a high percentage of volcanic rock and volcanically derived sediment. The area plateau has been eroded into semiround ridges and knolls and does not appear to be a plateau in many areas. Lava flows that have sharp, jagged edges are present in the Mammoth and Asay Creek areas, in the southwestern part of the survey area.

The Sevier Valley lies between the Markagunt Plateau on the west and the Sevier and Paunsaugunt Plateaus on the east. The Sevier River runs from south to north through the valley. Panguitch, the largest town in the survey area, is in the Sevier Valley. A large part of this valley is used as irrigated cropland and pastureland, and the remaining part is used mainly for livestock grazing.

The eastern edge of the Sevier Valley is marked by a steep escarpment that was formed by the Sevier Fault. On the eastern side of the fault are two plateaus—the Paunsaugunt Plateau on the south and the Sevier Plateau on the north. The eastern border of the Paunsaugunt Plateau is bounded by the Paunsaugunt Fault. The plateau is capped by the very colorful Claron Formation of Tertiary age. The eastern part of the plateau is a steep escarpment that forms Bryce Canyon National Park, and the western part is an escarpment known as the Sunset Cliffs. The Sevier Plateau is composed mainly of extrusive igneous rock, unlike its counterpart on the south, which is dominantly sedimentary rock. The Sevier Plateau is tilted to the east, but topographically it appears to be more like a mountain range. The plateau has the highest elevations in the survey area. Mount Dutton rises to an elevation of more than 11,000 feet.

Johns Valley is a north-south trending valley east of the Paunsaugunt and Sevier Plateaus. This valley is at elevations of 7,000 to 7,800 feet. The East Fork of the Sevier River flows from the Paunsaugunt Plateau along the bottom of Johns Valley. A small part of Johns Valley is used as irrigated cropland, and the rest is used mainly for livestock grazing.

The Tropic Amphitheater lies to the east of the Paunsaugunt Plateau, with Bryce Canyon National Park forming the western boundary. To the east of the amphitheater is a fixture wherein strata dip into the Kaiparowits Basin. Structurally, the amphitheater is more elevated than its adjoining physiographic neighbors, but topographically it is negative. Elevation is 5,800 to 6,800 feet. The headwaters of the Paria River are within the amphitheater. The Paria River, an important tributary of the Colorado River, flows into the Colorado River below the Glen Canyon Dam.

The Kaiparowits Plateau is in the eastern part of the survey area. The town of Escalante is on the plateau. The town of Boulder is northeast of Escalante, on the Escalante Bench. The Kaiparowits Plateau is warped into a series of north-south trending anticlines and synclines, which is reflected in the topography. Elevation ranges from 6,000 to 8,000 feet but is mainly 6,800 to 7,200 feet.

Climate

By Gaylen L. Ashcroft, climatologist, Utah State University.

Much of the survey area is mountainous. A plateau region runs along a north-south line through the center of the area—the Paunsaugunt Plateau on the south and part of the Sevier Plateau on the north. The climate at Bryce Canyon FAA Airport (table 1), on the Paunsaugunt Plateau, is typical of the climate in the more nearly level areas of the plateaus where elevation is about 7,000 feet. The climate at Bryce Canyon National Park Headquarters (table 1) is typical of the climate in the mountainous areas of the plateaus where elevation is about 8,000 feet.

West of this mountainous plateau region is the mountain valley in which the communities of Hatch, Panguitch, and Spry are located. The climate at Panguitch (table 1) is typical of the climate on valley bottoms. Most of the survey area's eastern part is in the East Fork Sevier River drainage basin.

The valley in the southeastern part of the survey area is the lowest part of the area. The communities of Cannonville, Henrieville, and Tropic are in this valley. The climate at Tropic (table 1) is typical of the climate in the valley.

Precipitation in the survey area ranges from about 8 inches to more than 30 inches. It increases as elevation increases. Most of the precipitation received in winter is deposited by frontal storms that approach the area from the west. Most of the precipitation received in summer is deposited by thunderstorms as moisture-laden air from the Gulf of Mexico moves across the area from the south and southeast. Closed lows aloft, which can develop at any time of the year but are most frequent in spring and fall, account for much of the total precipitation in most years.

Snow deposited in the mountains in winter supplies much of the water used in spring and summer to irrigate farmland in the lower valleys. Average annual snowfall ranges from about 25 inches in the valley near the southeast side of the survey area to about 110 inches in the higher lying mountainous areas.

The mean annual temperature in the survey area ranges from 38 to 49 degrees F. The warmest month, July, has an average maximum temperature of about 78 to 90 degrees. January, the coldest month, has an average minimum temperature that varies from about 3 to 16 degrees. The extreme maximum recorded temperature was 101 degrees at Tropic, and the extreme minimum recorded temperature was -38 degrees at Panguitch. Temperature data for four stations in the survey area are given in table 1.

The length of the growing season in the survey area decreases almost linearly with increases in elevation. It ranges from about 130 days in the southeast to less than 20 days at the top of Sevier Plateau, where freezing temperatures can occur any day of the year.

Pan evaporation has been estimated for four stations in the survey area (table 2). These estimates are based on a derived equation that applies to barren areas. In areas that support vegetation, such as forests and irrigated fields, the plants transpire enough to increase the humidity of the air. Consequently, pan evaporation in these areas is 10 to 15 percent less than that in barren areas. Pan evaporation in the survey area ranges from 34 to 45 inches during May through October.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually onto one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While the soil survey was in progress, samples of some of the soils in the area were collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses and under different levels of management. Some interpretations were modified to fit local conditions, and some new interpretations were developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The soils or miscellaneous areas making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils or miscellaneous areas can be identified on the map. Likewise, areas that are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general map units in this survey have been grouped into general kinds of landscape for broad interpretive purposes. Each of the broad groups and the map units in each group are described in the following pages.

Map Unit Descriptions

Soils Mainly on Stream Terraces, Fans, Flood Plains, and Valley Plains

This group consists of five map units. It makes up about 12 percent of the survey area.

1. Tebbs-Villy Family-Alldown

Very deep, well drained and poorly drained, nearly level to moderately sloping soils; on alluvial fans, flood plains, and valley plains

This map unit is in the western part of the survey area. Slope is 0 to 5 percent. The vegetation in areas not cultivated is mainly shrubs and grasses. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 9 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 4 percent of the survey area. It is about 40 percent Tebbs soils, 16 percent Villy Family soils, and 9 percent Alldown soils. The remaining 35 percent is components of minor extent.

Tebbs soils are on dissected alluvial fans and valley plains. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is pale brown sandy loam 5 inches thick. Below this to a depth of 60 inches or more is pale brown and very pale brown sandy loam.

Villy Family soils are on flood plains. These soils are very deep and poorly drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is light brownish gray silty clay loam 11 inches thick. Below this to a depth of 60 inches or more is light gray, white, and gray silty clay loam.

Alldown soils are on alluvial fans and valley plains. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is pinkish gray clay loam 10 inches thick. Below this to a depth of 60 inches or more are light gray, stratified very fine sandy loam to clay loam.

Of minor extent in this unit are Greenhalgh, Grimm, Jodero, Codley, and Descot soils.

This unit is used mainly as irrigated cropland. It is also used as rangeland and wildlife habitat.

2. Codley-Descot-Jodero

Very deep, well drained, nearly level to moderately sloping soils; on alluvial fans and valley plains

This map unit is in the eastern part of the survey area. Slope is 1 to 8 percent. The vegetation in areas not cultivated is mainly shrubs and grasses. Elevation is 6,500 to 7,500 feet. The average annual precipitation is

9 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 2 percent of the survey area. It is about 56 percent Codley soils, 12 percent Descot soils, and 8 percent Jodero soils. The remaining 24 percent is components of minor extent.

Codley soils are on alluvial fans and valley plains. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is light brown silt loam about 7 inches thick. Below this to a depth of 60 inches or more are light brown and pink silt loam and silty clay loam.

Descot soils are on alluvial fans and valley plains. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is pink silt loam about 5 inches thick. Below this to a depth of 60 inches or more is pink very fine sandy loam.

Jodero soils are on alluvial fans and valley plains. These soils are very deep and well drained. They formed in alluvium derived dominantly from mixed igneous and sedimentary rock. The surface layer is dark grayish brown loam about 28 inches thick. Below this to a depth of 60 inches or more is dark grayish brown loam.

Of minor extent in this unit are Alldown, Greenhalgh, Tebbs, Villy Family, and Bruman soils.

This unit is used mainly as rangeland and wildlife habitat. It is also used as irrigated cropland.

3. Mikim-Henrieville-Barx

Very deep, well drained, nearly level to moderately sloping soils; on dissected alluvial fans, alluvial terraces, and fan terraces

This map unit is in the southeastern part of the survey area. Slope is 1 to 10 percent. The vegetation in areas not cultivated is mainly shrubs and grasses. Elevation is 6,000 to 7,200 feet. The average annual precipitation is 9 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 100 to 140 days.

This unit makes up about 4 percent of the survey area. It is about 21 percent Mikim soils, 14 percent Henrieville soils, and 12 percent Barx soils. The remaining 53 percent is components of minor extent.

Mikim soils are on dissected alluvial fans and fan terraces. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is brown sandy loam about 5 inches thick. Below this to a depth of 60 inches or more are pale brown, light brownish gray, and very pale brown loam and clay loam.

Henrieville soils are on dissected alluvial fans. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is light brownish gray sandy loam about 12 inches thick. Below this to a depth of 60 inches or more are light brownish gray and light gray, stratified sandy loam and loamy sand.

Barx soils are on dissected alluvial fans and alluvial terraces. These soils are very deep and well drained. They formed in alluvial and eolian material derived dominantly from sedimentary rock. The surface layer is brown fine sandy loam about 5 inches thick. The subsoil is yellowish red and reddish yellow sandy clay loam and sandy loam about 26 inches thick. Below this to a depth of 60 inches or more is light reddish brown sandy loam.

Of minor extent in this unit are Baldfield, Yarts, Befar, Cannonville, Mespun, Mivida, Jodero, and Alldown soils.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

4. Frandsen-Playas

Very deep, well drained, nearly level to strongly sloping soils, and Playas; on valley plains, alluvial fans, flood plains, and valley bottoms

This map unit is in the southeastern part of the survey area. Slope is 1 to 15 percent. The vegetation on the Frandsen soils is mainly shrubs and grasses. The vegetation in the Playas is mainly sparse stands of saltgrass and forbs. Elevation is 6,800 to 7,500 feet. The average annual precipitation is about 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 1.5 percent of the survey area. It is about 66 percent Frandsen soils and 9 percent Playas. The remaining 25 percent is components of minor extent.

Frandsen soils are on alluvial fans and valley plains. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is light brownish gray loam about 3 inches thick. Below this to a depth of 60 inches or more is light brown, pinkish gray, and pale brown loam.

Areas of Playas are on flood plains and valley bottoms that are almost devoid of vegetation.

Of minor extent in this unit are Codley, Comodore, Notter, and Panguitch soils.

This unit is used as rangeland and wildlife habitat.

5. Crestline-Broncho

Very deep, well drained and somewhat excessively drained, gently sloping to moderately sloping soils; on dissected alluvial fans

This map unit is in the northwestern part of the survey area. Slope is 2 to 5 percent. The vegetation in areas not cultivated is mainly shrubs and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 100 to 120 days.

This unit makes up about 0.5 percent of the survey area. It is about 40 percent Crestline soils and 34 percent Broncho soils. The remaining 26 percent is components of minor extent.

Crestline soils are on dissected alluvial fans. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is grayish brown fine sandy loam about 3 inches thick. Below this to a depth of 60 inches or more is brown fine sandy loam.

Broncho soils are on dissected alluvial fans. These soils are very deep and somewhat excessively drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown and pale brown very gravelly sandy loam and sandy loam about 20 inches thick. Below this to a depth of 60 inches or more are brown and light brownish gray very gravelly fine sand and gravelly loamy fine sand.

Of minor extent in this unit are Tridell, Jodero, and Bruman soils.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used as irrigated cropland.

Soils on High Fans, Terraces, Benches, Pediments, Mountainsides, and Hillsides

This group consists of four map units. It makes up about 20 percent of the survey area.

6. Showalter-Guben-Panguitch

Very deep, well drained, nearly level to moderately steep soils; on dissected alluvial fans, stream terraces, pediments, and mountainsides

This map unit is in the southeastern part of the survey area. Slope is 0 to 30 percent. The native vegetation is mainly shrubs and grasses. Elevation is 7,000 to 8,500 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 5 percent of the survey area. It is about 20 percent Showalter soils, 20 percent Guben soils, and 12 percent Panguitch soils. The remaining 48 percent is components of minor extent.

Showalter soils are on pediments. These soils are very deep and well drained. They formed in alluvium derived dominantly from mixed igneous rock. The surface layer is dark brown gravelly loam about 5 inches thick. The subsoil is dark brown to yellowish red gravelly loam, very gravelly clay loam, and very gravelly clay about 31 inches thick. Below this to a depth of 60 inches or more is brown and pinkish white gravelly loam.

Guben soils are on pediments, mountainsides, and stream terraces. These soils are very deep and well drained. They formed in alluvium derived dominantly from mixed igneous rock. The surface layer is brown gravelly loam about 4 inches thick. The subsoil is brown gravelly loam and very gravelly sandy clay loam about 10 inches thick. Below this to a depth of 60 inches or more are light gray extremely gravelly sandy clay loam and extremely gravelly sandy loam.

Panguitch soils are on dissected alluvial fans. These soils are very deep and well drained. They formed in mixed alluvium. The surface layer is grayish brown gravelly loam about 5 inches thick. The subsoil is brown gravelly clay loam and gravelly sandy loam about 21 inches thick. Below this to a depth of 60 inches or more are pink gravelly sandy loam and very gravelly loamy sand.

Of minor extent in this unit are Notter, Zillion, Podo, Andys, Brycan, Schauson, and Evanston soils.

This unit is used as rangeland and wildlife habitat.

7. Mikim-Clapper-Yenlo

Very deep, well drained, gently sloping to steep soils; on fan terraces, mountainsides, and benches

This map unit is in the southeastern part of the survey area. Slope is 2 to 60 percent. The native vegetation is mainly shrubs, grasses, pinyon, and Utah juniper. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 90 to 110 days.

This unit makes up about 2 percent of the survey area. It is about 24 percent Mikim soils, 15 percent Clapper soils, and 13 percent Yenlo soils. The remaining 48 percent is components of minor extent.

Mikim soils are on benches and fan terraces. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is brown sandy loam about 5 inches thick. Below this to a depth of 60 inches or more are pale brown, light brownish gray, and very pale brown loam and clay loam.

Clapper soils are on benches and mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is brown cobbly loam about 3 inches thick. The subsoil is brown cobbly loam about 7 inches thick. Below this to a depth of 60 inches or more is brown, light yellowish brown, and pale brown very gravelly loam.

Yenlo soils are on benches and terraces. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is yellowish brown loam about 2 inches thick. The subsoil is brown clay loam about 21 inches thick. Below this to a depth of 60 inches or more are light yellowish brown and very pale brown clay loam and loam.

Of minor extent in this unit are Hernandez Family, Bayfield, Lazear, Cannonville, Clapper, and Zyme soils.

This unit is used as rangeland, woodland, and wildlife habitat.

8. Notter-Bruman-Tridell

Very deep, well drained, gently sloping to moderately steep soils; on alluvial fans, hillsides, mountainsides, and fan terraces

This map unit is in the eastern part of Panguitch Valley and in Johns Valley. Slope is 1 to 30 percent. The native vegetation is mainly shrubs and grasses with a few pinyon and Utah juniper. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 11 percent of the survey area. It is about 28 percent Notter soils, 21 percent Bruman soils, and 7 percent Tridell soils. The remaining 44 percent is components of minor extent.

Notter soils are on alluvial fans and mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown gravelly coarse sandy loam about 3 inches thick. The subsoil is brown gravelly sandy clay loam about 12 inches thick. Below this to a depth of 60 inches or more is brown, light gray, and pale brown very gravelly sandy loam.

Bruman soils are on alluvial fans, fan terraces, mountainsides, and hillsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is grayish brown gravelly loam about 10 inches thick. Below this to a depth of 60 inches or more are white and light gray very gravelly loam and very gravelly sand.

Tridell soils are on dissected alluvial fans and mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown cobbly loam about 8 inches thick. Below this to a depth of 60 inches or more are multicolored gravelly loam to extremely cobbly sand.

Of minor extent in this unit are Venture, Ipson, Notter, Luhon, Andys, and Greenhalgh soils.

This unit is used as rangeland and wildlife habitat.

9. Zinzer-Luhon-Tridell

Very deep, well drained, gently sloping to moderately steep soils; on alluvial fans, fan terraces, and mountainsides

This map unit is in the southwestern part of the survey area. Slope is 1 to 25 percent. The native vegetation is mainly shrubs and grasses with a few pinyon and Utah juniper. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 2 percent of the survey area. It is about 22 percent Zinzer soils, 17 percent Luhon soils, and 14 percent Tridell soils. The remaining 47 percent is components of minor extent.

Zinzer soils are on dissected alluvial fans. These soils are very deep and well drained. They formed in alluvium derived dominantly from sedimentary rock. The surface layer is brown loam about 12 inches thick. Below this to a depth of 60 inches or more are light yellowish brown and very pale brown clay loam and sandy loam.

Luhon soils are on alluvial fans and fan terraces. These soils are very deep and well drained. They formed in alluvium derived dominantly from mixed sedimentary and igneous rock. The surface layer is brown loam about 6 inches thick. The subsoil is light brown loam about 6 inches thick. Below this to a depth of 60 inches or more is pinkish white, pink, and light brown loam.

Tridell soils are on dissected alluvial fans and mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from mixed sedimentary and igneous rock. The surface layer is brown cobbly loam about 8 inches thick. Below this to a depth of 60 inches or more are very pale brown, light brownish gray, and pinkish white extremely cobbly loam, extremely cobbly sand, and cobbly loam.

Of minor extent in this unit are Notter, Yenlo, Brycan, Codley, and Bruman soils.

This unit is used as rangeland and wildlife habitat.

Soils Mainly on Hillsides, Low Mountains, Alluvial Fans, Fan Terraces, Benches, and Ridges

This group consists of five map units. It makes up about 23 percent of the survey area.

10. Ipson-Tridell

Very deep, well drained, moderately sloping to steep soils; on alluvial fans, mountainsides, hillsides, and fan terraces

This map unit is in the eastern part of the survey area. Slope is 4 to 60 percent. The native vegetation is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is about 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 5 percent of the survey area. It is about 45 percent Ipson soils and 15 percent Tridell soils. The remaining 40 percent is components of minor extent.

Ipson soils are on mountainsides, hillsides, and fan terraces. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown cobbly loam about 6 inches thick. The subsoil is brown very cobbly loam about 8 inches thick. Below this to a depth of 60 inches or more are very pale brown and light gray very gravelly loam, very gravelly sandy loam, and very gravelly sand.

Tridell soils are on dissected alluvial fans and mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown cobbly loam about 8 inches thick. Below this to a depth of 60 inches or more are multicolored layers that range from gravelly loam to extremely cobbly sand.

Of minor extent in this unit are Guben, Andys, Tolman, Zinzer, Circleville, and Widtsoe soils, Rock outcrop, and Notter and Bruman soils.

This unit is used as woodland, rangeland, and wildlife habitat.

11. Waltershow-Quilt-Venture

Very deep and shallow, well drained, gently sloping to steep soils; on mountainsides, low hills, ridges, benches, and dissected alluvial fans

This map unit is in the southwestern part of the survey area. Slope is 1 to 60 percent. The native vegetation is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 8,500 feet. The average annual precipitation is 9 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 6 percent of the survey area. It is about 30 percent Waltershow soils, 19 percent Quilt soils, and 10 percent Venture soils. The remaining 41 percent is components of minor extent.

Waltershow soils are on mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown extremely cobbly loam about 3 inches thick. The subsoil is brown and light brownish gray very cobbly clay and very cobbly clay loam about 17 inches thick. Below this to a depth of 60 inches or more are light gray, white, and light brownish gray extremely gravelly sandy loam and extremely gravelly sand.

Quilt soils are on mountainsides, benches, low hills, and dissected alluvial fans. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is dark grayish brown very cobbly loam about 4 inches thick. The subsoil is brown cobbly clay and cobbly clay loam about 39 inches thick. Below this to a depth of 60 inches or more are grayish brown and pinkish gray gravelly sandy clay loam and gravelly coarse sandy loam.

Venture soils are on mountainsides and ridges. These soils are shallow and well drained. They formed in residuum, colluvium, and alluvium derived dominantly from igneous rock. The surface layer is dark grayish brown very cobbly silt loam about 6 inches thick. Below this to a depth of 15 inches is brown and pale brown very gravelly clay loam. An indurated, lime-cemented hardpan is at a depth of 15 inches.

Of minor extent in this unit are Zillion, Harol, Andys, and Ipson soils.

This unit is used as woodland, rangeland, and wildlife habitat.

12. Tolman-Comodore-Waltershow

Shallow and very deep, well drained, strongly sloping to steep soils; on mountainsides and ridges

This map unit is in the northwestern part of the survey area. Slope is 8 to 60 percent. The native vegetation is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 8,500 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 6 percent of the survey area. It is about 22 percent Tolman soils, 15 percent Comodore soils, and 10 percent Waltershow soils. The remaining 53 percent is components of minor extent.

Tolman soils are on mountainsides and ridges. These soils are shallow and well drained. They formed in residuum derived dominantly from igneous rock. The surface layer is brown very cobbly silt loam about 12 inches thick. Below this to a depth of 16 inches is brown very cobbly clay loam. Unweathered igneous rock is at a depth of 16 inches.

Comodore soils are on mountainsides and ridges. These soils are shallow and well drained. They formed in residuum and alluvium derived dominantly from igneous rock. The surface layer is brown extremely cobbly clay loam about 6 inches thick. Below this to a depth of 13 inches is brown very cobbly clay loam. Unweathered igneous rock is at a depth of 13 inches.

Waltershow soils are on mountainsides. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is brown extremely cobbly loam about 3 inches thick. The subsoil is brown and light brownish gray very cobbly clay and very cobbly clay loam about 17 inches thick. Below this to a depth of 60 inches or more are light gray, white, and light brownish gray extremely gravelly sandy loam and extremely gravelly sand.

Of minor extent in this unit are Ipson soils, Rock outcrop, and Plite, Venture, Harol, Dalcan, and Redcreek soils.

This unit is used as woodland, rangeland, and wildlife habitat.

13. Harol-Dalcan-Bushvalley

Shallow, moderately deep and very deep, well drained and somewhat excessively drained, gently sloping to steep soils; on mountainsides, alluvial fans, and benches

This map unit is in the northwestern part of the survey area. Slope is 2 to 50 percent. The native vegetation is mainly shrubs and grasses with a few pinyon, juniper, and quaking aspen. Elevation is 7,300 to 9,000 feet. The average annual precipitation is 14 to 18 inches, the average annual air temperature is 36 to 44 degrees F, and the average freeze-free period is 50 to 100 days.

This unit makes up about 3 percent of the survey area. It is about 46 percent Harol soils, 16 percent Dalcan soils, and 12 percent Bushvalley soils. The remaining 26 percent is components of minor extent.

Harol soils are on mountainsides, dissected alluvial fans, and benches. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is dark brown very cobbly loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 20 inches thick. Below this to a depth of 60 inches or more are brown and pale brown extremely cobbly loamy sand and extremely cobbly sand.

Dalcan soils are on mountainsides and dissected alluvial fans. These soils are moderately deep and well drained. They formed in residuum derived dominantly from igneous rock. The surface layer is dark grayish brown very cobbly loam about 4 inches thick. Below this to a depth of 22 inches are dark grayish brown and brown very gravelly clay and very cobbly clay loam. Unweathered igneous rock is at a depth of 22 inches.

Bushvalley soils are on mountainsides. These soils are shallow and somewhat excessively drained. They formed in residuum derived dominantly from igneous rock. The surface layer is dark brown very stony loam about 11 inches thick. Below this to a depth of 19 inches is brown very cobbly sandy clay loam. Unweathered igneous rock is at a depth of 19 inches.

Of minor extent in this unit are Tolman and Hughes soils.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used as woodland.

14. Wiggler-Guben-Quilt

Shallow and very deep, well drained, gently sloping to very steep soils; on alluvial fans, mountainsides, low hills, pediments, and benches

This map unit is in the southwestern part of the survey area. Slope is 1 to 70 percent. The native vegetation is mainly pinyon, ponderosa pine, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 18 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

This unit makes up about 3 percent of the survey area. It is about 20 percent Wiggler soils, 20 percent Guben soils, and 14 percent Quilt soils. The remaining 46 percent is components of minor extent.

Wiggler soils are on mountainsides. These soils are shallow and well drained. They formed in residuum and colluvium derived dominantly from shale. The surface layer is gray very cobbly loam about 7 inches thick. Below this to a depth of 19 inches are light gray loam and clay loam. Shale is at a depth of 19 inches.

Guben soils are on pediments. These soils are very deep and well drained. They formed in alluvium derived dominantly from mixed igneous rock. The surface layer is grayish brown and brown gravelly loam about 4 inches thick. The subsoil is brown and light gray gravelly loam, very gravelly sandy clay loam, and extremely gravelly sandy clay loam. Below this to a depth of 60 inches or more are light gray and white extremely gravelly sandy clay loam, very gravelly loam, and extremely gravelly sandy loam.

Quilt soils are on mountainsides, structural benches, low hills, and alluvial fans. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is dark grayish brown very cobbly loam about 4 inches thick. The subsoil is brown cobbly clay and cobbly clay loam 39 inches thick. Below this to a depth of 60 inches or more are grayish brown and pinkish gray gravelly sandy clay loam and gravelly coarse sandy loam.

Of minor extent in this unit are Frandsen, Harol, Tolman, Schauson, and Tridell soils.

This unit is used as woodland, rangeland, and wildlife habitat.

Soils on Plateaus Formed in Sedimentary Rock

This group consists of four map units. It makes up about 30 percent of the survey area.

15. Ruko-Rock Outcrop-Swapps

Shallow and moderately deep, well drained, moderately sloping to very steep soils, and Rock outcrop; on mountainsides, mesas, and hillsides

This map unit is in the south-central part of the survey area. Slope is 5 to 65 percent. The vegetation is mainly juniper at the lower elevations and mixed conifers at the higher elevations. Elevation is 7,300 to 9,600 feet. The average annual precipitation is 14 to 27 inches, the average annual air temperature is 36 to 44 degrees F, and the average freeze-free period is 55 to 100 days.

This unit makes up about 7 percent of the survey area. It is about 19 percent Ruko soils, 17 percent Rock outcrop, and 14 percent Swapps soils. The remaining 50 percent is components of minor extent.

Ruko soils are on mountainsides. These soils are shallow and well drained. They formed in residuum derived dominantly from sedimentary rock. The soils are pale brown clay loam about 4 inches thick. Below this to a depth of 19 inches is light gray clay. Shale is at a depth of 19 inches.

Rock outcrop generally occurs as vertical limestone cliffs immediately below the plateau rim and as exposures of limestone and sandstone on ridges and steep side slopes.

Swapps soils are on mesas, mountainsides, and hillsides. These soils are moderately deep and well drained. They formed in colluvium and residuum derived dominantly from sedimentary rock. The surface is covered with a mat of partially decomposed to highly decomposed needles and twigs. The surface layer is brown gravelly loam about 3 inches thick. The subsoil is yellowish red gravelly loam about 5 inches thick. Below this to a depth of 23 inches is dark brown and pink very gravelly loam. Limestone is at a depth of 23 inches.

Of minor extent in this unit are Syrett, Frandsen, Skutum, and Sheege soils.

This unit is used as watershed, wildlife habitat, rangeland, and recreation areas.

16. Badland-Rock Outcrop

Steep and very steep, strongly dissected areas; on plateau side slopes

This map unit is in the south-central part of the survey area. It is mainly on mountains that are dissected by numerous *V*-shaped valleys and sharp divides. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 22 inches, the average annual air temperature is 38 to 44 degrees F, and the average freeze-free period is 70 to 100 days.

This unit makes up about 8 percent of the survey area. It is about 27 percent Badland and 20 percent Rock outcrop. The remaining 53 percent is components of minor extent.

Badland consists of barren areas of shale that are dissected by many intermittent drainageways. Runoff is very high, and erosion is active.

Rock outcrop consists of barren or nearly barren exposures of interbedded limestone, sandstone, and shale. It is characterized by spectacular columns, spires, pinnacles, and shear walls.

Of minor extent in this unit are Paunsaugunt, Syrett, Vanet, Zyme, Lazear, and Cannonville soils.

Most areas of this unit are used for recreation. A few areas are used as wildlife habitat.

17. Pahreah-Syrett-Badland

Moderately deep, well drained and somewhat excessively drained, gently sloping to very steep soils, and Badland; on mesa side slopes, hillsides, mountainsides, and benches

This map unit is in the south-central part of the survey area. Slope is 2 to 65 percent. The native vegetation is mainly mixed conifers, shrubs, and grasses. Elevation is 7,100 to 9,600 feet. The average annual precipitation is 16 to 25 inches, the average annual air temperature is 36 to 45 degrees F, and the average freeze-free period is 55 to 90 days.

This unit makes up about 10 percent of the survey area. It is about 13 percent Pahreah soils, 13 percent Syrett soils, and 8 percent Badland. The remaining 66 percent is components of minor extent.

Pahreah soils are on mesa side slopes and hillsides. These soils are moderately deep and somewhat excessively drained. They formed in colluvium and residuum derived dominantly from sedimentary rock. The surface layer is brown very gravelly loam about 1 inch thick. The subsoil is brown very gravelly loam about 11 inches thick. Below this to a depth of 38 inches are pinkish white and pink extremely gravelly loam and extremely cobbly loam. Limestone is at a depth of 38 inches.

Syrett soils are on benches and mesa side slopes. These soils are moderately deep and well drained. They formed in colluvium and residuum derived dominantly from sedimentary rock. The surface layer is brown gravelly loam and very gravelly loam about 12 inches thick. Below this to a depth of 38 inches are brown and reddish yellow very gravelly loam and very gravelly silt loam. Limestone is at a depth of 38 inches.

Badland consists of steep and very steep, barren areas of shale that occur primarily on south aspects. Runoff is very high, and erosion is active.

Of minor extent in this unit are Swapps, Skutum, Frandsen, Sevier, Losee, Neto, Kade, Hatch, and Sheege soils, and Rock outcrop.

This unit is used as woodland, rangeland, wildlife habitat, and recreation areas.

18. Podo-Cannonville-Rock Outcrop

Shallow, well drained and somewhat excessively drained, strongly sloping to very steep soils, and Rock outcrop; on ridges, hills, mountainsides, and benches

This map unit is in the southeastern part of the survey area. Slope is 10 to 70 percent. The vegetation on the Podo soils is mainly pinyon, Utah juniper, shrubs, and grasses, and the vegetation on the Cannonville soils is mainly shrubs and grasses. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 8 to 16 inches, the average annual air temperature is 42 to 49 degrees F, and the average freeze-free period is 70 to 110 days.

This unit makes up about 5 percent of the survey area. It is about 18 percent Podo soils, 18 percent Cannonville soils, and 15 percent Rock outcrop. The remaining 49 percent is components of minor extent.

Podo soils are on mountainsides, benches, and rolling hills. These soils are shallow and somewhat excessively drained. They formed in residuum and alluvium derived dominantly from sedimentary rock. The surface layer is brown gravelly sandy loam about 6 inches thick. Below this to a depth of 19 inches are light yellowish brown gravelly sandy loam and cobbly sandy loam. Sandstone is at a depth of 19 inches.

Cannonville soils are on ridges and hillsides. These soils are shallow and well drained. They formed in residuum derived dominantly from shale. The soils are light olive gray clay about 7 inches thick. Shale is at a depth of 7 inches.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

Of minor extent in this unit are Badland and Ruko, Lazear, Dimyaw Family, Frandsen, and Widtsoe soils.

This unit is used as woodland, rangeland, and wildlife habitat.

Soils Formed in Igneous Material on High Mountains

This group consists of three map units. It makes up about 15 percent of the survey area.

19. Castino-Rock Outcrop-Circleville

Moderately deep, well drained, moderately sloping to steep soils, and Rock outcrop; on hillsides and mountainsides

This map unit is in the north-central part of the survey area. Slope is 5 to 60 percent. The vegetation in areas not cultivated is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 9,600 feet. The average annual precipitation is 14 to 22 inches, the average annual air temperature is 36 to 44 degrees F, and the average freeze-free period is 50 to 100 days.

This unit makes up about 7 percent of the survey area. It is about 29 percent Castino soils, 29 percent Rock outcrop, and 26 percent Circleville soils. The remaining 16 percent is components of minor extent.

Castino soils are on hillsides and mountainsides. These soils are moderately deep and well drained. They formed in colluvium and residuum derived dominantly from igneous rock. The surface layer is dark grayish brown and very dark grayish brown extremely cobbly loam and gravelly loam about 8 inches thick. The subsoil to a depth of 38 inches is dark brown and brown gravelly clay loam, very cobbly clay loam, and extremely cobbly clay. Igneous rock is at a depth of 38 inches.

Rock outcrop consists of exposures of basic and intermediate igneous rock. It occurs as very steep cliffs and escarpments.

Circleville soils are on mountainsides. These soils are moderately deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is grayish brown very gravelly loam about 2 inches thick. The subsoil is brown and pinkish gray very gravelly clay loam and very cobbly loam about 15 inches thick. Below this to a depth of 24 inches is very pale brown very cobbly loam. Igneous rock is at a depth of 24 inches.

Of minor extent in this unit are Tica Family and Behanin soils.

This unit is used as rangeland, watershed, wildlife habitat, and recreation areas.

20. Callings-Behanin-Castino

Moderately deep and very deep, well drained, moderately sloping to very steep soils; on hillsides, mountains, and ridges

This map unit is in the north-central part of the survey area. Slope is 5 to 70 percent. The vegetation in areas not cultivated is mainly mixed conifers, shrubs, and grasses. Elevation is 8,200 to 10,500 feet. The average annual precipitation is 16 to 30 inches, the average annual air temperature is 34 to 42 degrees F, and the average freeze-free period is 45 to 65 days.

This unit makes up about 6 percent of the survey area. It is about 28 percent Callings soils, 28 percent Behanin soils, and 6 percent Castino soils. The remaining 38 percent is components of minor extent.

Callings soils are on gently rolling ridgetops and mountaintops. These soils are very deep and well drained. They formed in alluvium and residuum derived dominantly from igneous rock. The surface layer is very dark gray and dark brown loam about 11 inches thick. The subsurface layer is brown cobbly loam about 7 inches thick. The subsoil is reddish brown very cobbly clay, very cobbly clay loam, and extremely cobbly clay loam about 27 inches thick. Below this to a depth of 60 inches or more is yellowish red extremely gravelly clay loam.

Behanin soils are on hillsides and mountainsides. These soils are very deep and well drained. They formed in colluvium and residuum derived dominantly from igneous rock. The surface layer is dark grayish brown loam about 2 inches thick. The subsurface layer is grayish brown loam about 15 inches thick. The subsoil is brown and dark brown very cobbly loam about 27 inches thick. Below this to a depth of 60 inches or more are dark brown very cobbly loam and extremely cobbly sandy loam.

Castino soils are on hillsides and mountainsides. These soils are moderately deep and well drained. They formed in colluvium and residuum derived dominantly from igneous rock. The surface layer is dark grayish brown and very dark grayish brown extremely cobbly loam and gravelly loam. The subsoil to a depth of 38 inches is dark brown and brown gravelly clay loam, very cobbly clay, and extremely cobbly clay loam. Igneous rock is at a depth of 38 inches.

Of minor extent in this unit are Winnemucca, Echard, and Ess soils.

Most areas of this unit are used as rangeland, wildlife habitat, and watershed. A few areas are used as woodland and recreation areas.

21. Winnemucca-Hoodle

Very deep, well drained, moderately sloping soils; on dissected pediments and in mountain meadows

This map unit is in the north-central part of the survey area. Slope is 5 to 10 percent. The vegetation in areas not cultivated is mainly shrubs and grasses. Elevation is 8,500 to 10,500 feet. The average annual precipitation is 18 to 30 inches, the average annual air temperature is 34 to 42 degrees F, and the average freeze-free period is 50 to 75 days.

This unit makes up about 2 percent of the survey area. It is about 39 percent Winnemucca soils and 24 percent Hoodle soils. The remaining 37 percent is components of minor extent.

Winnemucca soils are in mountain meadows. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is very dark grayish brown gravelly silt loam about 11 inches thick. The subsoil is brown and reddish brown very cobbly clay loam and extremely cobbly clay loam about 17 inches thick. Below this to a depth of 60 inches or more is light reddish brown extremely stony loam.

Hoodle soils are on dissected pediments. These soils are very deep and well drained. They formed in alluvium derived dominantly from igneous rock. The surface layer is grayish brown and dark grayish brown gravelly loam 9 inches thick. The subsoil is brown and yellowish brown very gravelly sandy clay loam and very cobbly sandy clay loam 10 inches thick. Below this to a depth of 60 inches or more is yellowish brown extremely cobbly sandy loam.

Of minor extent in this unit are Castino, Tica Family, Callings, and Behanin soils.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for recreation.

Broad Land Use Considerations

The soils in this survey area have potential for a variety of land uses, including irrigated cropland, rangeland, woodland, wildlife habitat, and recreation.

Areas suited to irrigated crops are mainly in general soil map units 1, 2, and 3. If irrigated crops are grown in these areas, an adequate supply of irrigation water must be made available.

Some areas of rangeland are in all units except unit 16, which consists of Badland and Rock outcrop and is mainly inside Bryce Canyon National Park. Wet soils, both irrigated and nonirrigated, occur on low fans and terraces near the Sevier River in unit 1. Large parts of units 3, 6, 9, 10, 11, and 13 are suitable for mechanical or chemical tree and brush removal and for seeding. Selected areas of units 8, 12, 14, 15, and 21 are suited to brush and tree removal and to seeding.

Woodland is dominantly in units 10, 14, 15, 17, 18, 19, 20, and 21. Most of the timber harvest is done in unit 17. The understory vegetation in most of these units is used for grazing. Units 19, 20, and 21 have an overstory of mixed conifers and aspen and an understory that is used for grazing. Units 10, 11, 12, and 18 support an overstory of pinyon and juniper and an understory of shrubs and grasses that are used for grazing mainly in summer.

Recreation areas are dominantly in units 15, 16, 17, 19, and 20. Units 10, 19, 20, and 21 provide habitat for elk. Units 15, 16, 17, 19, 20, and 21 provide summer range for deer. Most deer in the survey area winter on units 7, 8, 9, 10, 11, and 12. During severe winters deer move onto irrigated cropland and stockyards in units 1, 2, and 3, doing considerable damage to cropland and haystacks.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavior divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alldown loam, alkali, 1 to 2 percent slopes, is one of several phases in the Alldown series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Sheege-Swapps complex, 30 to 50 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Frandsen-Neto association, 1 to 8 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Map Unit Descriptions

1—Ahlstrom-Osote complex, 1 to 15 percent slopes. This map unit is on alluvial fans and low terraces adjacent to the tributaries of the East Fork of the Sevier River. Slopes are plane to convex and are medium in length. The present native vegetation is mainly black sagebrush. Elevation is 7,600 to 8,400 feet. The average annual precipitation is about 14 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 80 days.

This unit is 55 percent Ahlstrom silt loam, 1 to 3 percent slopes; 35 percent Osote silty clay loam, 3 to 15 percent slopes; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Kade soils on wet bottom lands and 5 percent Skutum very fine sandy loam in long stringers at the head of streams. Also included are small areas of Losee soils on the upper part of alluvial fans.

The Ahlstrom soil is very deep and well drained. It formed in mixed alluvium derived dominantly from limestone, sandstone, and shale. Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil is brown silty clay loam about 7 inches thick. The upper 6 inches of the substratum is reddish yellow silty clay loam, and the lower part to a depth of 60 inches or more is reddish yellow silty clay.

Permeability of the Ahlstrom soil is slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 8 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight.

The Osote soil is very deep and well drained. It formed in alluvium and colluvium derived dominantly from limestone and sandstone. Typically, the surface layer is brown silty clay loam about 9 inches thick. The upper 11 inches of the subsoil is brown silty clay loam, and the lower 13 inches is light brown and yellowish red silty clay loam. The substratum to a depth of 60 inches or more is stratified light reddish brown and reddish yellow very gravelly loam and extremely cobbly loam. In some places the surface layer is silt loam.

Permeability of the Osote soil is slow. Available water capacity is 7.5 to 9.0 inches. Water supplying capacity is 8 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 55 percent grasses, 10 percent forbs, and 35 percent shrubs. Important plants are black sagebrush, nodding bromegrass, Nevada bluegrass, and western wheatgrass. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Mountain Loam (Black Sagebrush) range site.

2—Alldown clay loam, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains in Panguitch Valley and near Antimony and Hatch. It formed in alluvium derived dominantly from mixed igneous rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is about 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pinkish gray, moderately alkaline clay loam about 10 inches thick. The upper 18 inches of the underlying material is light gray, moderately alkaline clay loam, the next 26 inches is light gray, moderately alkaline silt loam and clay loam, and the lower part to a depth of 60 inches or more is light gray, moderately alkaline very fine sandy loam.

Included in this unit are about 10 percent Tebbs loam and 5 percent Greenhalgh silt loam that has slopes of 1 to 2 percent. Also included are small areas of medium textured soils that have a dark colored surface layer.

Permeability of this Alldown soil is moderately slow. Available water capacity is 9 to 11 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. Reaction is slightly higher in nonirrigated areas than in irrigated areas.

Most areas of this unit are used for irrigated crops and as wildlife habitat. A few areas are used as rangeland.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are Indian ricegrass, needleandthread, basin big sagebrush, blue grama, and western wheatgrass. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Basin Big Sagebrush) range site.

3—Alldown clay loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains near Hatch and Antimony and in the Widtsoe area. It formed in alluvium derived dominantly from mixed igneous rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is about 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pinkish gray, moderately alkaline clay loam about 10 inches thick. The upper 18 inches of the underlying material is light gray, moderately alkaline clay loam, the next 26 inches is light gray, moderately alkaline silt loam and clay loam, and the lower part to a depth of 60 inches or more is light gray, moderately alkaline very fine sandy loam.

Included in this unit are about 10 percent Tebbs sandy loam and 5 percent Luhon loam. Also included are small areas of fine textured soils that have slopes of 2 to 4 percent.

Permeability of this Alldown soil is moderately slow. Available water capacity is 9 to 11 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

Most areas of this unit are used for irrigated crops and as wildlife habitat. A few areas are used as rangeland.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are Indian ricegrass, needleandthread, basin big sagebrush, blue grama, and western wheatgrass. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is slope. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Basin Big Sagebrush) range site.

4—Alldown loam, alkali, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains west of Escalante. It formed in alluvium derived dominantly from sandstone and shale. Slopes are long. The present vegetation in most areas is mainly basin big sagebrush, greasewood, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is about 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is light brownish gray loam about 4 inches thick. The upper 8 inches of the underlying material is pale brown sandy loam, the next 37 inches is light brownish gray loam and clay loam, and the lower part to a depth of 60 inches or more is light brownish gray sandy clay loam.

Included in this unit are about 10 percent Borollic Natrargids and 5 percent Alldown clay loam that has slopes of 2 to 5 percent. Also included are small areas of Jodero loam that is moist.

Permeability of this Alldown soil is moderately slow. Available water capacity is 7.5 to 9.0 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important plants are basin wildrye, western wheatgrass, basin big sagebrush, and rubber rabbitbrush. The suitability of the unit for rangeland seeding is very poor. The main limitation is the alkali content of the soil.

This map unit is in capability subclass VIIs, nonirrigated. It is in Loamy Bottom range site.

5—Alldown clay loam, moist, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley floors in the Hatch area and near the Kane-Garfield County line, along Highway 89. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are linear and long. The present vegetation in most areas is mainly mountain big sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pinkish gray clay loam about 10 inches thick. The upper 18 inches of the underlying material is light gray clay loam, the next 26 inches is light gray silt loam and clay loam, and the lower part to a depth of 60 inches or more is light gray very fine sandy loam.

Included in this unit are about 10 percent Evanston loam and 5 percent Tebbs loam.

Permeability of this Alldown soil is moderately slow. Available water capacity is 9 to 11 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, mountain big sagebrush, blue grama, bottlebrush squirreltail, and winterfat. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam range site.

6—Andys loam, 2 to 15 percent slopes. This very deep, well drained soil is on plateaus and dissected alluvial fans near Panguitch, north and west of the Pink Cliffs Motel, and near Widtsoe, in Johns Valley. The soil formed in alluvium derived dominantly from mixed igneous and sedimentary rock. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown loam about 8 inches thick. The upper 22 inches of the underlying material is white loam, the next 17 inches is white gravelly loam, and the lower part to a depth of 60 inches or more is light gray gravelly sandy loam. A layer of lime accumulation is at a depth of about 8 inches.

Included in this unit are about 5 percent Zinzer loam, 4 percent Bruman cobbly loam that is moist and has slopes of 10 to 30 percent, 3 percent Tridell loam, and 3 percent Schauson loam that has slopes of 4 to 15 percent.

Permeability of this Andys soil is moderately rapid. Available water capacity is 7.0 to 8.5 inches. Water supplying capacity is 7 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, blue grama, antelope bitterbrush, and needleandthread. The suitability of the unit for rangeland seeding is fair. The main limitations are slope and low precipitation. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

7—Andys very cobbly loam, 8 to 25 percent slopes. This very deep, well drained soil is on mountainsides and dissected alluvial fans in Panguitch Valley. It formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly black sagebrush. Some areas of this unit have an overstory of pinyon and Utah juniper. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown very cobbly loam about 7 inches thick. The upper 29 inches of the underlying material is light gray gravelly loam, and the lower part to a depth of 60 inches or more is very pale brown loam. A layer of lime accumulation is at a depth of about 7 inches.

Included in this unit are about 10 percent Notter gravelly loam and 5 percent soils that are similar to this Andys soil but are 40 to 60 inches deep to bedrock.

Permeability of this Andys soil is moderately rapid. Available water capacity is 8 to 9 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is fair. The main limitations are the very cobbly surface layer and slope. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

8—Badland-Cannonville-Rock outcrop complex, 30 to 50 percent slopes. This map unit is on breaks, hills, ridgesides, and mountainsides throughout the survey area. Slopes are convex to concave and are short. The present vegetation in most areas is mainly shrubs and grasses and a very sparse stand of pinyon and Utah juniper. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 70 to 120 days.

This unit is 45 percent Badland; 30 percent Cannonville clay, 30 to 50 percent slopes; 15 percent Rock outcrop; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Redcreek cobbly loam and 5 percent Cannonville very stony clay.

Badland consists of steep or very steep, barren areas of shale that are dissected by many intermittent drainageways. Areas of Badland commonly are semiarid. Potential runoff is very high, and erosion is active.

The Cannonville soil is shallow and well drained. It formed in residuum derived dominantly from shale. Typically, the surface layer is light olive gray clay about 7 inches thick. Shale is at a depth of 7 inches. Depth to shale ranges from 7 to 20 inches.

Permeability of the Cannonville soil is slow. Available water capacity is 1 to 2 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 7 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland and wildlife habitat.

The potential plant community on the Cannonville soil is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, shadscale, Indian ricegrass, bottlebrush squirreltail, and roundleaf buffaloberry. The suitability of this soil for rangeland seeding is very poor. The main limitations are the low available water capacity and depth to shale.

This map unit is in capability class VIII, nonirrigated. The Cannonville soil is in Semidesert Shallow Clay (D35) range site. Rock outcrop and Badland are not placed in a range site.

9—Badland-Rock outcrop-Paunsaugunt complex, 2 to 20 percent slopes. This map unit is on eroded side slopes and mesa tops along the breaks of the Paunsaugunt Plateau and along the drainageways that have dissected the plateau. Slopes are short and complex. The present vegetation is mainly ponderosa pine. Elevation is 7,300 to 9,000 feet. The average annual precipitation is 16 to 22 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 50 to 80 days.

This unit is 30 percent Badland, 30 percent Rock outcrop, 20 percent Paunsaugunt gravelly loam, 2 to 20 percent slopes, and 20 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Ruko clay loam, 5 percent Podo very gravelly loam, and 5 percent Syrett gravelly loam.

Badland consists of steep or very steep, barren areas of shale that are dissected by many intermittent drainageways. Runoff is very high, and erosion is active. Shallow gullies and severe rills in the surface are common.

Rock outcrop consists of barren or nearly barren exposures of interbedded limestone, sandstone, and shale. Columns, spires, pinnacles, and shear walls are typical.

The Paunsaugunt soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from limestone. Typically, the surface layer is brown gravelly loam about 3 inches thick. The next layer is grayish brown very cobbly sandy loam about 5 inches thick. The substratum is light brownish gray very cobbly sandy loam about 7 inches thick over limestone. Limestone is at a depth of 15 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Paunsaugunt soil is moderately rapid. Available water capacity is 1 to 2 inches. Water supplying capacity is 2 to 6 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is rapid, and the hazard of water erosion is severe.

Most areas of this unit are used as wildlife habitat and watershed. A few areas are used as woodland. Many areas of this unit provide outstanding esthetic value.

The potential plant community on the Paunsaugunt soil consists of an overstory of ponderosa pine, bristlecone pine, and white fir with an understory of 25 percent grasses, 15 percent forbs, and 60 percent shrubs. Important understory plants are Indian ricegrass, muttongrass, sedge, greenleaf manzanita, Utah serviceberry, and Gambel oak.

The Paunsaugunt soil is poorly suited to the production of ponderosa pine. The site index for ponderosa pine ranges from 30 to 45. The main concerns in producing and harvesting timber are the hazard of erosion, steepness of slope, shallow soil depth, high rate of seedling mortality, and limited access.

Conventional methods of harvesting timber can be used in areas that have slopes of less than 45 percent and in steeper areas where the length of the slopes does not exceed 200 feet. Brushy plants such as manzanita limit natural regeneration of ponderosa pine. Trees are subject to windthrow because of the limited rooting depth. Specialized methods of planting such as hand planting of containerized seedlings or shade blocks may be needed to ensure successful regeneration or improvement of a stand.

Several sensitive plant species occur in this unit.

This map unit is in capability subclass VIIs, nonirrigated. The Paunsaugunt soil is in Mountain Shallow Loam (Ponderosa Pine) woodland site. Badland and Rock outcrop are not placed in a range or woodland site.

10—Baldfield clay, 2 to 4 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Tropic and Henrieville areas. The soil formed in alluvium derived dominantly from shale. Slopes are slightly undulating and are medium in length. The vegetation in areas not cultivated is mainly shadscale and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the soil is grayish brown, strongly alkaline clay to a depth of 60 inches or more.

Included in this unit are about 10 percent Befar clay and small areas of soils east of Tropic that are stratified in texture and color.

Permeability of this Baldfield soil is slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is slightly saline.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are wedgeleaf saltbush, galleta, shadscale, green molly kochia, and Indian ricegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are low precipitation and the clayey texture and salinity of the soil.

If this unit is used for irrigated crops, the main limitations are slope and slow permeability. Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. Water needs to be applied at a slow rate over a long period to ensure that the root zone is properly wetted. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Alkali Fan (D35) range site.

11—Baldfield clay, 2 to 8 percent slopes, eroded. This very deep, well drained soil is on dissected alluvial fans in the valleys near Tropic and Henrieville. The soil formed in alluvium derived dominantly from shale. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly shadscale and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the soil is grayish brown clay to a depth of 60 inches or more.

Included in this unit are about 10 percent Befar clay and 5 percent Mikim clay loam that is dry, has slopes of 2 to 5 percent, and is on the lower end of fans.

Permeability of this Baldfield soil is slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is severe. This soil is slightly saline. It has gullies 2 to 6 feet deep and 100 to 300 feet apart.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are galleta, wedgeleaf saltbush, shadscale, and Indian ricegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are low precipitation and the salinity and clayey texture of the soil.

This map unit is in capability subclass VIs, nonirrigated. It is in Alkali Fan (D35) range site.

12—Barx fine sandy loam, 2 to 10 percent slopes. This very deep, well drained soil is on dissected alluvial fans and alluvial terraces south of Escalante. The soil formed in alluvial and eolian material derived dominantly from sedimentary rock. Slopes are long and slightly undulating. The present vegetation in most areas is mainly big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 120 to 140 days.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The upper 7 inches of the subsoil is yellowish red sandy clay loam, and the lower 19 inches is reddish yellow sandy loam. The substratum to a depth of 60 inches or more is light reddish brown sandy loam. A layer of lime accumulation is at a depth of about 31 inches. In some areas the surface layer is gravelly.

Included in this unit is about 10 percent Mivida fine sandy loam. Also included are small areas of Hernandez Family soils.

Permeability of this Barx soil is moderate. Available water capacity is 8 to 9 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, galleta, needleandthread, and winterfat. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Loam (D35) range site.

13—Bayfield clay, 2 to 8 percent slopes. This very deep, well drained soil is on fan terraces and valley plains on Bulldog Bench and on Sheep Flat, southwest of Cannonville. The soil formed in alluvium derived dominantly from shale. Slopes are linear to slightly convex and are long. In large areas that have been plowed and seeded, the present vegetation is mainly crested wheatgrass, and in areas that have not been plowed or seeded, it is mainly fourwing saltbush, black sagebrush, big sagebrush, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 110 days.

Typically, the surface layer is light brownish gray clay about 3 inches thick. Below this to a depth of 60 inches or more is light brownish gray clay. In some areas the surface layer is loam.

Included in this unit is about 10 percent Mikim sandy loam.

Permeability of this Bayfield soil is slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate. This unit has gullies 1 to 2 feet deep and 300 to 500 feet apart.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are mountain big sagebrush, western wheatgrass, Indian ricegrass, winterfat, and black sagebrush. The suitability of the unit for rangeland seeding is fair. The main limitations are low precipitation and the clayey texture of the soil. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals. Grazing when the soil is moist results in compaction of the surface layer, low production, and excessive runoff. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIs. It is in Upland Clay (D35) range site.

14—Befar clay, 4 to 8 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Tropic and east of Henrieville. The soil formed in alluvium derived dominantly from shale. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly shadscale and black greasewood. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the soil is grayish brown clay to a depth of 60 inches or more.

Included in this unit are about 5 percent Baldfield clay that has slopes of 2 to 8 percent and is eroded and 10 percent Mikim clay loam that is dry and has slopes of 2 to 5 percent.

Permeability of this Befar soil is slow. Available water capacity is 7 to 9 inches. Water supplying capacity is 4 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is moderately saline. It has gullies 2 to 6 feet deep and 100 to 300 feet apart. Sheet and rill erosion is also active on the unit.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important plants are black greasewood, bottlebrush squirreltail, alkali sacaton, and galleta. The suitability of the unit for rangeland seeding is very poor. The main limitation is the salinity of the soil.

This map unit is in capability subclass VIIe, nonirrigated. It is in Alkali Flat (D35) range site.

15—Behanin loam, 30 to 70 percent slopes. This very deep, well drained soil is on north exposures of long, narrow, east- and west-oriented ridges and hills in the vicinity of Mount Dutton. The soil formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Slopes are linear and short. The present vegetation is mainly spruce and fir. Elevation is 8,200 to 10,500 feet. The average annual precipitation is 18 to 30 inches, the average annual air temperature is 34 to 40 degrees F, and the freeze-free period is 45 to 65 days.

Typically, the surface is covered with a mat of undecomposed and partly decomposed needles and twigs about 1 inch thick. The surface layer is dark grayish brown loam about 2 inches thick. The subsurface layer is grayish brown loam 15 inches thick. The subsoil is brown and dark brown very cobbly loam about 27 inches thick. The substratum to a depth of 60 inches or more is dark brown extremely cobbly sandy loam.

Included in this unit are about 10 percent Callings loam on short, convex ridgetops and 5 percent Castino gravelly silt loam on north exposures below an elevation of 8,500 feet. Also included are small areas of Rock outcrop along ridge crests.

Permeability of this Behanin soil is moderate. Available water capacity is 6 to 7 inches. Water supplying capacity is 10 to 16 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit consists of an overstory of spruce and fir and an understory of 55 percent grasses, 20 percent forbs, and 25 percent shrubs. Important understory plants are bearded wheatgrass, mountain brome, meadowrue, and Columbia needlegrass.

This unit has a low to moderate potential for the production of commercial timber. The site index for subalpine fir ranges from 40 to 50; for Douglas fir, 40 to

65; and for spruce, 30 to 40. The main concerns for producing and harvesting timber are steepness of slope and limited access.

Conventional methods of harvesting timber can be used in areas that have slopes of less than 45 percent and in steeper areas where the slopes are 200 feet long or less. In areas where the slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong. Long periods of snowpack restrict vehicle traffic for 7 to 8 months during the year.

This map unit is in capability subclass VIIe, nonirrigated. It is in High Mountain Loam (Engelmann Spruce) woodland site.

16—Blanchard Family sand, 30 to 70 percent slopes. These deep, excessively drained soils are on the sides of ridges in the southeastern part of Bryce Canyon National Park, below the Paunsaugunt Plateau rim. They formed in residuum and eolian deposits derived dominantly from sandstone. Slopes are short and complex. The present vegetation is mainly manzanita, ponderosa pine, and Gambel oak. Elevation is 7,600 to 8,200 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 41 to 43 degrees F, and the freeze-free period is 70 to 90 days.

No single profile of the Blanchard Family soils is typical, but one commonly observed in the survey area is light gray to very pale brown sand about 55 inches thick over sandstone. Depth to bedrock ranges from 40 to 60 inches.

Included in this unit are about 10 percent deep sandy soils that have a subsoil of calcareous gravelly loam, 5 percent Rock outcrop, and 5 percent Ruko clay loam.

Permeability of the Blanchard Family soils is rapid. Available water capacity is 3.5 to 4.5 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 40 to 60 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is severe.

This unit is used as wildlife habitat, woodland, and watershed.

The potential plant community on this unit consists of an overstory of ponderosa pine and an understory of 30 percent grasses, 15 percent forbs, and 55 percent shrubs. Important understory plants are Indian ricegrass, greenleaf manzanita, and Gambel oak.

The potential of the Blanchard Family soils for production of timber is low. The site index for ponderosa pine ranges from 35 to 50. The main concerns for producing and harvesting timber are steepness of slope, low productivity, high rate of seedling mortality, high hazard of soil blowing, and limited access.

Conventional methods of harvesting timber can be used in areas that have slopes of less than 45 percent and in steeper areas where slopes are 200 feet long or less. In areas where slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. The low available water capacity adversely affects seedling survival. Brushy plants such as manzanita limit natural regeneration of ponderosa pine. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

Where the timber is removed, this unit can produce 200 to 400 pounds of forage per acre.

This map unit is in capability subclass VIIe, nonirrigated. It is in Mountain Sand (Ponderosa Pine) woodland site.

17—Borollic Natrargids, 0 to 1 percent slopes. These very deep, moderately well drained soils are on flood plains and fan terraces along the East Fork of the Sevier River, in Johns Valley. These soils formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are linear and long. The present vegetation in most areas is mainly rubber rabbitbrush, greasewood, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is about 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period 75 to 100 days.

Typically, the surface layer is pale brown silt loam about 2 inches thick. The subsoil is brown and light brown clay loam about 13 inches thick. The upper 20 inches of the substratum is pink clay loam, and the lower part to a depth of 60 inches or more is very pale brown clay loam and loam. These soils are affected by sodium throughout most of the profile.

Included in this unit are about 10 percent Villy Family soils and 5 percent Jodero loam.

Permeability of these Borollic Natrargids is slow. Available water capacity is 9.5 to 11.0 inches. Water supplying capacity is 6.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. These soils are subject to flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. The soils are subject to rare periods of flooding.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 80 percent grasses, 5 percent forbs, and 15 percent shrubs. Important plants are inland saltgrass, alkali sacaton, alkali bluegrass, sedges, and black greasewood. The suitability of the unit for rangeland seeding is very poor. The main limitations are the salinity of the surface layer, the alkalinity of the subsoil, and low precipitation. Undesirable plants can be controlled by spraying with chemicals.

This map unit is in capability subclass VIIs, irrigated. It is in Alkali Bottom range site.

18—Broncho very gravelly sandy loam, 2 to 5 percent slopes. This very deep, somewhat excessively drained soil is on dissected alluvial fans south of Circle Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are linear and long. The present vegetation in most areas is mainly Wyoming big sagebrush, blue grama, and needleandthread. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 8 to 11 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is brown very gravelly sandy loam about 6 inches thick. The subsoil is pale brown sandy loam about 14 inches thick. The upper 23 inches of the substratum is brown very gravelly fine sand, and the lower part to a depth of 60 inches or more is light brownish gray gravelly loamy fine sand.

Included in this unit are about 10 percent Mikim loam that is dry and 5 percent Crestline fine sandy loam.

Permeability of this Broncho soil is moderately rapid. Available water capacity is 3 to 4 inches. Water supplying capacity is 4.5 to 6.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are bluebunch wheatgrass, Wyoming big sagebrush, Indian ricegrass, and Nevada Mormon tea. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation, low water supplying capacity, and the very gravelly surface layer.

This map unit is in capability subclass VIIe, nonirrigated. It is in Semidesert Gravelly Loam (Wyoming Big Sagebrush) South (D28A) range site.

19—Bruman loam, 2 to 5 percent slopes. This very deep, well drained soil is on fan terraces near Panguitch, in Johns Valley, and near Hatch. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are undulating and long. The vegetation in areas not cultivated is mainly black sagebrush, big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline loam about 10 inches thick. The upper 12 inches of the underlying material is light gray, moderately alkaline very gravelly loam, the next 17 inches is white, moderately alkaline very gravelly sandy loam, and the lower part to a depth of 60 inches or more is very pale brown, moderately alkaline very gravelly sand.

Included in this unit are about 10 percent Tridell loam and 5 percent Luhon loam. Also included are small areas of Notter loam.

Permeability of this Bruman soil is moderately rapid. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland and wildlife habitat. It is also used for irrigated crops.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, and blue grama. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitations are slope and low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. If furrow irrigation is used, water should be applied at frequent intervals and runs should be short. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

20—Bruman gravelly loam, 2 to 10 percent slopes. This very deep, well drained soil is on fan terraces near Panguitch and Hatch, in Johns Valley, and near Antimony. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush, Wyoming big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown gravelly loam about 10 inches thick. The upper 21 inches of the underlying material is white very gravelly loam, and the lower part to a depth of 60 inches or more is light gray very gravelly sand.

Included in this unit are about 10 percent Notter gravelly coarse sandy loam and Tridell cobbly loam.

Permeability of the Bruman soil is moderately rapid. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by railing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

21—Bruman cobbly loam, moist, 10 to 30 percent slopes. This very deep, well drained soil is on mountainsides and hillsides in Johns Valley and southeast of Hatch. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are convex and are medium in length. The present vegetation in most areas is mainly pinyon, juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown cobbly loam 9 inches thick. The upper 22 inches of the underlying material is white very cobbly sandy loam, and the lower part to a depth of 60 inches or more is pale brown very cobbly sand.

Included in this unit are about 10 percent Andys very cobbly loam and 5 percent Tridell gravelly loam.

Permeability of the Bruman soil is moderately rapid. Available water capacity is 3.0 to 4.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community consists of an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are antelope bitterbrush, mountain big sagebrush, black sagebrush, Indian ricegrass, and blue grama. The suitability of the unit for rangeland seeding is fair. The main limitations are low precipitation, slope, and the cobbly surface layer. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

22—Bruman cobbly loam, moist, 30 to 50 percent slopes. This very deep, well drained soil is on mountainsides and hillsides south of Hatch. It formed in alluvium derived dominantly from mixed igneous rock. Slopes are convex and short. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown cobbly loam about 9 inches thick. The upper 22 inches of the underlying material is white very cobbly sandy loam, and the lower part to a depth of 60 inches or more is pale brown very cobbly sand.

Included in this unit are about 10 percent Zinzer loam and 5 percent Tridell very cobbly loam. Also included are small areas of Redcreek cobbly loam and Rock outcrop near Panguitch Creek.

Permeability of the Bruman soil is moderately rapid. Available water capacity is 3.0 to 4.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community on this unit consists of an overstory of pinyon and juniper with an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are mountain big sagebrush, black sagebrush, antelope bitterbrush, bluegrass, Indian ricegrass, and blue grama. The suitability of the unit for rangeland seeding is very poor. The main limitation is steepness of slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

23—Bruman very cobbly loam, 5 to 30 percent slopes. This very deep, well drained soil is on fan terraces in Circle Valley, near Panguitch, Antimony, and Hatch and in Johns Valley. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are undulating or convex and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown very cobbly loam about 8 inches thick. The upper 30 inches of the underlying material is white very cobbly sandy loam, and the lower part to a depth of 60 inches or more is very pale brown very gravelly loamy sand.

Included in this unit are about 10 percent Andys very cobbly loam and Luhon very cobbly sandy loam. Also included are small areas of Notter very cobbly loam.

Permeability of the Bruman soil is moderately rapid. Available water capacity is about 3.0 to 4.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 40 percent grasses, 10 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and the very cobbly surface layer. Undesirable plants can be controlled by railing, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Semidesert Stony Loam range site.

24—Bruman very cobbly loam, 30 to 50 percent slopes. This very deep, well drained soil is on mountainsides and hillsides in Circle Valley and in the Panguitch, Hatch, and Antimony areas. It formed in alluvium derived dominantly from mixed igneous rock. Slopes are convex and short. The present vegetation in most areas is mainly black sagebrush, Wyoming big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown very cobbly loam about 8 inches thick. The upper 30 inches of the underlying material is white very cobbly sandy loam, and the lower part to a depth of 60 inches or more is very pale brown very gravelly loamy sand.

Included in this unit are about 10 percent Ipson very stony loam and 5 percent Notter gravelly loam. Also included are small areas of Rock outcrop.

Permeability of the Bruman soil is moderately rapid. Available water capacity is 3.0 to 4.5 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is high.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 40 percent grasses, 10 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is very poor. The main limitation is steepness of slope.

This map unit is in capability subclass VIIs, nonirrigated. It is in Semidesert Stony Loam range site.

25—Brycan very fine sandy loam, 1 to 6 percent slopes. This very deep, well drained soil is on alluvial fans and valley plains near Bryce Canyon Junction, south of Hatch, in the Mammoth Creek area, near Coal Pit Wash, and east of Henrieville. The soil formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are linear or gently undulating and are long. The vegetation in areas not cultivated is mainly black sagebrush, bitterbrush, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown, mildly alkaline very fine sandy loam about 4 inches thick. The subsoil is brown, mildly alkaline loam about 25 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, moderately alkaline loam.

Included in this unit are about 10 percent Schauson loam that has slopes of 2 to 4 percent and Panguitch gravelly sandy loam that has slopes of 2 to 5 percent.

Permeability of this Brycan soil is moderate. Available water capacity is 10.0 to 11.5 inches. Water supplying capacity is 8 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for irrigated crops.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

26—Brycan very fine sandy loam, 6 to 15 percent slopes. This very deep, well drained soil is on alluvial fans and in valleys near Coal Pit Wash, Mammoth Creek, and Assay Creek and south of Hatch. The soil formed in alluvium derived dominantly from mixed igneous and sedimentary rock. Slopes are linear and long. The present vegetation in most areas is mainly black sagebrush, bitterbrush, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown very fine sandy loam about 12 inches thick. The subsoil is brown and reddish yellow sandy clay loam about 25 inches thick. The upper 10 inches of the substratum is brownish yellow sandy loam, and the lower part to a depth of 60 inches or more is light yellowish brown clay loam.

Included in this unit are about 8 percent Quilt very cobbly loam that has slopes of 4 to 25 percent, 3 percent Zillion very cobbly loam, and 2 percent Mitch silt loam. Also included are small areas of Podo very gravelly loam on ridges and hillsides, very deep soils that are similar to this Brycan soil but have a gravelly substratum, and shallow soils that support ponderosa pine.

Permeability of the Brycan soil is moderate. Available water capacity is 9 to 11 inches. Water supplying capacity is 7 to 9 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, blue grama, and antelope bitterbrush. The suitability of the unit for rangeland seeding is fair. The main limitation is slope. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

27—Bushvalley very stony loam, 15 to 40 percent slopes. This shallow, somewhat excessively drained soil is on mountainsides in the Dog Valley area. The soil formed in residuum derived dominantly from basic and intermediate igneous rock. Slopes are undulating and short. The present vegetation in most areas is mainly mountain big sagebrush, mountain snowberry, and grasses. Elevation is 8,300 to 9,000 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 36 to 40 degrees F, and the freeze-free period is 55 to 70 days.

Typically, the surface layer is dark brown very stony loam about 11 inches thick. The subsoil is brown very cobbly sandy clay loam about 8 inches thick. Igneous bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit are about 10 percent shallow soils that have less than 35 percent rock fragments. Also included are small areas of Bushvalley soils that have slopes of 40 to 60 percent.

Permeability of the Bushvalley soil is moderately slow. Available water capacity is 1 to 2 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 16 to 20 inches. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are bluebunch wheatgrass, slender wheatgrass, muttongrass, and antelope bitterbrush. The suitability of the unit for rangeland seeding is very poor. The main limitation is the low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. It is in Mountain Shallow Loam range site.

28—Callings-Winnemucca association, 5 to 15 percent slopes. This map unit is on convex ridgetops and mountaintops in the vicinity of Table Mountain and Winnemucca Flats. Slopes of the Callings soil are convex in shape and medium in length, and those of the Winnemucca soil are concave and long. The present vegetation on the Callings soil is mainly aspen, and on the Winnemucca soil it is mainly grass. Elevation is 9,400 to 10,500 feet. The average annual precipitation is 25 to 30 inches, the average annual air temperature is 34 to 38 degrees F, and the freeze-free period is 50 to 60 days.

This unit is 60 percent Callings loam, 5 to 15 percent slopes; 25 percent Winnemucca gravelly silt loam, 5 to 10 percent slopes; and 15 percent other soils.

Included in this unit are about 5 percent Castino extremely cobbly loam that has moderately steep to steep, south-facing slopes; 5 percent Castino gravelly silt loam in the parks on Table Mountain; and 5 percent Behanin soils that have steep, north-facing slopes.

The Callings soil is very deep and well drained. It is on convex ridgetops and gently rolling to rolling mountaintops. It formed in alluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the surface layer is very dark gray and dark brown loam about 11 inches thick. The subsurface layer is brown cobbly loam about 7 inches thick. The upper 14 inches of the subsoil is reddish brown very cobbly clay loam and very cobbly clay, and the lower 13 inches is reddish brown extremely cobbly clay loam. The substratum to a depth of 60 inches or more is yellowish red extremely gravelly clay loam.

Permeability of the Callings soil is slow. Available water capacity is 5 to 6 inches. Water supplying capacity is 12 to 15 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Winnemucca soil is very deep and well drained. It is in meadows on mountaintops. It formed in alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is very dark grayish brown gravelly silt loam about 11 inches thick. The upper 7 inches of the subsoil is brown very cobbly loam, and the lower 10 inches is reddish brown very cobbly clay loam and extremely cobbly clay loam. The substratum to a depth of 60 inches or more is light reddish brown extremely stony loam.

Permeability of the Winnemucca soil is slow. Available water capacity is 5 to 6 inches. Water supplying capacity is 12 to 15 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Callings soil consists of an overstory of aspen and an understory of 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Important understory plants are mountain brome, bearded wheatgrass, bluegrass, and mountain snowberry.

The Callings soil has a moderate potential for the production of aspen. The site index for aspen ranges from 60 to 70.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

Spraying, burning, or clearcutting aspen in a mosaic pattern is beneficial in producing browse and fawning and calving cover for deer and elk.

The Callings soil can produce 1,000 to 1,600 pounds of forage per acre in areas where the timber is removed.

The potential plant community on the Winnemucca soil is 55 percent grasses, 25 percent forbs, and 20 percent shrubs. Important plants are mountain brome, bearded wheatgrass, slender wheatgrass, and currant. The suitability of the soil for rangeland seeding is fair. The main limitation is the gravelly surface layer.

The soils in this unit store moisture in winter that can be released slowly in spring.

This map unit is in capability subclass VIe, nonirrigated. The Callings soil is in High Mountain Loam (Aspen) woodland site. The Winemucca soil is in High Mountain Loam range site.

29—Cannonville clay, 30 to 50 percent slopes. This shallow, well drained soil is on ridges and hills in the Tropic area. The soil formed in residuum derived dominantly from shale. Slopes are convex in shape and are medium in length. The present vegetation in most areas is mainly shadscale, eriogonum, and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light olive gray clay about 7 inches thick. Shale is at a depth of 7 inches. Depth to weathered shale ranges from 7 to 20 inches.

Included in this unit are about 10 percent fine textured soils that are similar to this Cannonville soil but are 20 to 40 inches deep over shale and 5 percent Cannonville very stony clay that has slopes of 30 to 50 percent and is intermingled throughout the unit.

Permeability of the Cannonville soil is slow. Available water capacity is 1 to 2 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 7 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Important plants are shadscale, black sagebrush, Indian ricegrass, bottlebrush squirreltail, and roundleaf buffaloberry. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity, depth to shale, and steepness of slope.

This map unit is in capability subclass VIIs, nonirrigated. It is in Semidesert Shallow Clay (D35) range site.

30—Cannonville very stony clay, 30 to 50 percent slopes. This shallow, well drained soil is on the sides of ridges and on hills in the Tropic area. The soil formed in residuum derived dominantly from shale. Slopes are convex in shape and are medium in length. The present vegetation in most areas is mainly shadscale, eriogonum, and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray very stony clay about 2 inches thick. The underlying material, to a depth of 18 inches, is light brownish gray clay. Weathered shale is at a depth of 18 inches. Depth to weathered shale ranges from 7 to 20 inches.

Included in this unit are about 10 percent fine textured soils that are 20 to 40 inches deep over weathered shale and are in depressional areas and 5 percent Zyme clay that is intermingled throughout the unit.

Permeability of this Cannonville soil is slow. Available water capacity is 2 to 3 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 7 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Important plants are shadscale, Indian ricegrass, black sagebrush, bottlebrush squirreltail, and roundleaf buffaloberry. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity, depth to weathered shale, very stony surface layer, and steepness of slope.

This map unit is in capability subclass VIIs, nonirrigated. It is in Semidesert Shallow Clay (D35) range site.

31—Castino-Behanin association, 20 to 70 percent slopes. This map unit is on hillsides and mountainsides at the heads of Casto Canyon, Lime Kiln Draw, Showalter Creek, and Callings Hollow and along the West Fork of Hunt Creek. Slopes are complex in shape and are short to medium in length. The present vegetation on the Castino soil is mainly mountain big sagebrush, and on the Behanin soil it is mainly spruce and subalpine fir. Elevation is 8,300 to 9,600 feet. The average annual precipitation is 16 to 22 inches, the average annual air temperature is 34 to 42 degrees F, and the freeze-free period is 45 to 65 days.

This unit is 45 percent Castino extremely cobbly loam, 20 to 50 percent slopes, on south aspects; 35 percent Behanin loam, 30 to 70 percent slopes, on north aspects; and 20 percent other soils.

Included in this unit are about 10 percent Callings loam, 5 percent Ess gravelly fine sandy loam, and 5 percent Rock outcrop.

The Castino soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the upper 3 inches of the surface layer is dark grayish brown extremely cobbly loam and the lower 5 inches is very dark grayish brown gravelly loam. The upper 6 inches of the subsoil is dark brown gravelly clay loam, and the lower 24 inches is brown very cobbly clay and extremely cobbly clay loam. Fractured bedrock is at a depth of 38 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Castino soil is slow. Available water capacity is 3 to 4 inches. Water supplying capacity is 6 to 9 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 8 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Behanin soil is very deep and well drained. It formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the surface layer is dark grayish brown and grayish brown loam about 17 inches thick. The upper 12 inches of the subsoil is brown very cobbly loam, and the lower 15 inches is dark brown very cobbly loam. The substratum to a depth of 60 inches or more is dark brown extremely cobbly sandy loam.

Permeability of the Behanin soil is moderate to a depth of 44 inches and moderately rapid below this depth. Available water capacity is 6 to 7 inches. Water supplying capacity is 9 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, wildlife habitat, and watershed.

The potential plant community on the Castino soil is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are mountain brome, bluegrass, muttongrass, antelope bitterbrush, Gambel oak, and mountain big sagebrush. The suitability of this soil for rangeland seeding is poor. Mechanical treatment is not practical, because the surface is stony and the slopes are steep. Brush management by prescribed burning or chemical treatment may be suitable in some areas of this soil to improve wildlife habitat and increase the production of forage for livestock grazing.

The potential plant community on the Behanin soil consists of an overstory of spruce and fir and an understory of 55 percent grasses, 20 percent forbs, and 25 percent shrubs. Important understory plants are mountain brome, bearded wheatgrass, and meadowrue.

The Behanin soil has low to moderate potential for the production of commercial timber. The site index for subalpine fir ranges from 40 to 50; for Douglas fir, 40 to 65; and for spruce, 30 to 50. The main concerns in producing and harvesting timber are steepness of slope and limited access.

Conventional methods of harvesting timber can be used in areas that have slopes of less than 45 percent and in steeper areas where slopes are 200 feet long or less. In areas where slopes are more than 45 percent and more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong. Hand planting of nursery stock usually is necessary to establish or improve a stand.

The soils in this unit store moisture in winter that can be released slowly in spring.

The Castino soil is in capability subclass VIIs, nonirrigated, and the Behanin soil is in capability subclass VIIe, nonirrigated. The Castino soil is in Mountain Stony Loam range site, and the Behanin soil is in High Mountain Loam (Engelmann Spruce) woodland site.

32—Castino-Tica Family complex, 20 to 70 percent slopes. This map unit is on hillsides, mountainsides, and ridges between Pine and Prospect Creeks and near the headwaters of Chokecherry Creek, Horse Valley Creek, and Smith Canyon, in the north-central part of the area. Slopes are complex in shape and are short to medium in length. The present vegetation on the Castino soil is mainly mountain big sagebrush, and on the Tica Family soils it is mainly black sagebrush. Elevation is 8,300 to 9,400 feet. The average annual precipitation is 16 to 22 inches, the average annual air temperature is 36 to 42 degrees F, and the average freeze-free period is 50 to 65 days.

This unit is 45 percent Castino extremely cobbly loam, 20 to 50 percent slopes, on north and east aspects; 40 percent Tica Family cobbly loam, 20 to 70 percent slopes, on south and west aspects and on ridges; and 15 percent other soils and miscellaneous areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Rock outcrop along the crest of hills and ridges, 5 percent

Behanin loam that is on steep north aspects and supports spruce and fir, and 5 percent Tolman very cobbly loam that is at lower elevations and supports pinyon and juniper. Also included are small areas of Riverwash in drainageways.

The Castino soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the upper 3 inches of the surface layer is dark grayish brown extremely cobbly loam, and the lower 5 inches is very dark grayish brown gravelly loam. The upper 6 inches of the subsoil is dark brown gravelly clay loam, and the lower 24 inches is brown very cobbly clay and extremely cobbly clay loam. Fractured bedrock is at a depth of 38 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Castino soil is slow. Available water capacity is 3 to 4 inches. Water supplying capacity is 6 to 9 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 8 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Tica Family soils are shallow and well drained. They formed in residuum derived dominantly from intermediate volcanic rock. No single profile is typical of the Tica Family soils, but one commonly observed in the survey area has a surface layer that is dark grayish brown and grayish brown cobbly loam about 5 inches thick over dark grayish brown very cobbly clay loam 4 inches thick. The upper 6 inches of the subsoil is grayish brown and dark grayish brown very stony clay, and the lower 3 inches is grayish brown and dark grayish brown very stony clay loam. Volcanic bedrock is at a depth of 18 inches. Depth to bedrock ranges from 15 to 20 inches.

Permeability of the Tica Family soils is slow. Available water capacity is 1.5 to 2.5 inches. Water supplying capacity is 3 to 8 inches. Effective rooting depth is 15 to 20 inches. The organic matter content of the surface layer is 2 to 4 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, wildlife habitat, and watershed.

The potential plant community on the Castino soil is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are mountain brome, bluegrass, muttongrass, antelope bitterbrush, Gambel oak, and mountain big sagebrush.

The potential plant community on the Tica Family soils is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Nevada bluegrass, muttongrass, slender wheatgrass, antelope bitterbrush, and bluebunch wheatgrass. The suitability of these soils for rangeland seeding is poor. The main limitations are steepness of slope and the cobbly surface layer. Brush management by prescribed burning or chemical treatment may be suitable in some areas of these soils to improve wildlife habitat and increase the production of forage for livestock grazing.

The Castino soil can store moisture in winter that can be released slowly in spring. The Tica Family soils can store limited amounts of moisture for use as watershed.

This map unit is in capability subclass VIIs, nonirrigated. The Castino soil is in Mountain Stony Loam range site. The Tica Family soils are in Mountain Shallow Loam range site.

33—Castino-Winnemucca association, 5 to 30 percent slopes. This map unit is on a basalt flow that has been covered in part with a thin mantle of mixed volcanic alluvium and is on the Sevier Plateau, east of Table Mountain. Slopes are undulating and are medium in length. The present vegetation is mainly mountain big sagebrush. Elevation is 8,300 to 9,500 feet. The average annual precipitation is 16 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 50 to 55 days.

This unit is 50 percent Castino gravelly silt loam, 5 to 10 percent slopes, on the upper part of the basalt flow; 30 percent Winnemucca gravelly loam, 15 to 30 percent slopes, on the lower part of the basalt flow that is mantled with alluvium; and 20 percent other soils and miscellaneous areas.

Included in this unit are about 5 percent deep clay in depressional areas, 5 percent Rock outcrop along drainageways, 5 percent Behanin loam that has steep, north-facing slopes, and 5 percent Hoodle gravelly loam on ridgetops.

The Castino soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from basalt. Typically, the surface layer is dark grayish brown gravelly silt loam about 8 inches thick. The subsoil is reddish brown very cobbly clay and extremely cobbly clay loam 30 inches thick. Fractured bedrock is at a depth of 38 inches. Depth to basalt ranges from 20 to 40 inches.

Permeability of the Castino soil is slow. Available water capacity is 3 to 4 inches. Water supplying capacity is 6 to 9 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 8 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Winnemucca soil is very deep and well drained. It is in meadows on mountaintops. It formed in alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is very dark grayish brown gravelly loam about 16 inches thick. The upper 7 inches of the subsoil is brown very cobbly clay, and the lower 9 inches is brown extremely cobbly clay loam. The substratum to a depth of 60 inches or more is light brown extremely cobbly clay loam.

Permeability of the Winnemucca soil is slow. Available water capacity is 6 to 7 inches. Water supplying capacity is 8 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Castino soil is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are mountain brome, bluegrass, muttongrass, antelope bitterbrush, and Gambel oak.

The potential plant community on the Winnemucca soil is 65 percent grasses, 20 percent forbs, and 15 percent shrubs. Important plants are bluebunch wheatgrass, mountain brome, and mountain big sagebrush.

The suitability of this unit for rangeland seeding is fair. The main limitations are slope and the gravelly surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIe, nonirrigated. The Castino soil is in Mountain Stony Loam range site, and the Winnemucca soil is in Mountain Loam range site.

34—Circleville-Rock outcrop complex, 25 to 60 percent slopes. This map unit is on mountainsides in the Cottonwood Creek area of Johns Valley. Slopes are convex and short. The present vegetation in most areas is mainly pinyon, juniper, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 50 percent Circleville very gravelly loam, 25 to 60 percent slopes, 35 percent Rock outcrop, and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Podo channery sandy loam and 10 percent very cobbly soils that are 40 to 60 inches deep to bedrock.

The Circleville soil is moderately deep and well drained. It formed in alluvium derived dominantly from intermediate igneous rock. Typically, the surface layer is grayish brown very gravelly loam about 2 inches thick. The upper 7 inches of the subsoil is brown very gravelly clay loam, and the lower 8 inches is pinkish gray very cobbly loam. The substratum is very pale brown very cobbly loam about 7 inches thick. Igneous bedrock is at a depth of 24 inches. Depth to bedrock ranges from 20 to 36 inches.

Permeability of the Circleville soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 20 to 36 inches. The organic matter content of the surface layer is 2 to 4 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Circleville soil consists of an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are black sagebrush, Indian ricegrass, antelope bitterbrush, bluegrass, and blue grama. The suitability of the soil for rangeland seeding is poor. The main limitations are slope, low available water capacity, and the areas of Rock outcrop. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by mechanical treatment or prescribed burning.

This map unit is in capability subclass VIIs, nonirrigated. The Circleville soil is in Upland Stony Loam (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a woodland site.

35—Clapper cobbly loam, 5 to 30 percent slopes. This very deep, well drained soil is on fan terraces, structural benches, and ridges in the Tropic and Henrieville areas. It formed in alluvium derived dominantly from mixed sedimentary rock. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 100 to 120 days.

Typically, the surface layer is brown cobbly loam about 3 inches thick. The subsoil is brown cobbly loam about 7 inches thick. The upper 10 inches of the substratum is brown very gravelly loam, the next 19 inches is pale brown very gravelly loam, and the lower part to a depth of 60 inches or more is light yellowish brown very gravelly loam. A layer of lime accumulation is at a depth of about 10 inches.

Included in this unit are about 10 percent Clapper cobbly loam that has slopes of 30 to 60 percent and 5 percent Lazear gravelly sandy loam that has slopes of 8 to 20 percent. Also included are small areas of gravelly soils that have a darker colored surface layer and soils in an area east of Henrieville that receive less than 12 inches of precipitation and do not support pinyon and Utah juniper.

Permeability of the Clapper soil is moderate. Available water capacity is 5 to 6 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit consists of an overstory of pinyon and juniper and an understory of 40 percent grasses, 5 percent forbs, and 55 percent shrubs. Important understory plants are green Mormon tea, rock goldenrod, Nevada bluegrass, muttongrass, and blue grama. The suitability of the unit for rangeland seeding is fair. The main limitations are low precipitation, slope, and the cobbly surface layer. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) (D35) woodland site.

36—Clapper cobbly loam, 30 to 60 percent slopes. This very deep, well drained soil is on the sides of mountains and benches near the town of Tropic and in the Sheep Creek area. The soil formed in alluvium derived dominantly from limestone. Slopes are linear and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, cliffrose, serviceberry, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 100 days.

Typically, the surface layer is brown cobbly loam about 3 inches thick. The subsoil is brown cobbly loam about 7 inches thick. The upper 10 inches of the substratum is brown very gravelly loam, the next 19 inches is pale brown very gravelly loam, and the lower part to a depth of 60 inches or more is light yellowish brown very gravelly loam. A layer of lime accumulation is at a depth of about 10 inches.

Included in this unit are about 10 percent Bruman cobbly loam that is moist and has slopes of 30 to 50 percent and 5 percent soils that are similar to this Clapper soil but are 15 to 35 percent rock fragments.

Permeability of the Clapper soil is moderate. Available water capacity is 5 to 6 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit consists of an overstory of pinyon and juniper and an understory of 40 percent grasses, 5 percent forbs, and 55 percent shrubs. Important understory plants are green Mormon tea, rock goldenrod, Nevada bluegrass, muttongrass, and blue grama. The suitability of the unit for rangeland seeding is very poor. The main limitation is steepness of slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) (D35) woodland site.

37—Codley silt loam, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains west of Red Canyon and in Johns Valley, near Widtsoe. It formed in alluvium derived dominantly from limestone and sandstone. Slopes are linear and long. The vegetation in areas not cultivated is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is light brown, strongly alkaline silt loam about 7 inches thick. The upper 10 inches of the underlying material is light brown, strongly alkaline silt loam, the next 13 inches is pink, strongly alkaline silty clay loam, and the lower part to a depth of 60 inches or more is pink, strongly alkaline silt loam.

Included in this unit are about 10 percent Descot silt loam and 5 percent Alldown clay loam that has slopes of 1 to 2 percent.

Permeability of this Codley soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are western wheatgrass, winterfat, basin big sagebrush, Indian ricegrass, and fourwing saltbush. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to the production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Silt Loam range site.

38—Codley silt loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains between Bryce Canyon Junction and Hatch and in Johns Valley, near Widtsoe. It formed in alluvium derived dominantly from limestone and sandstone. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is light brown, strongly alkaline silt loam about 7 inches thick. The upper 10 inches of the underlying material is light brown, strongly alkaline silt loam, the next 13 inches is pink, strongly alkaline silty clay loam, and the lower part to a depth of 60 inches or more is pink, strongly alkaline silt loam.

Included in this unit are about 10 percent Descot silt loam that is dry and 5 percent Greenhalgh silt loam that has slopes of 1 to 2 percent.

Permeability of this Codley soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are western wheatgrass, winterfat, basin big sagebrush, Indian ricegrass, and fourwing saltbush. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Silt Loam range site.

39—Comodore-Rock outcrop complex, 15 to 40 percent slopes. This map unit is on mountainsides and on ridgetops along mountains in Panguitch Valley. Slopes are convex to concave and are short. The present vegetation in most areas is mainly pinyon, juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 60 percent Comodore extremely cobbly clay loam, 15 to 40 percent slopes, eroded; 30 percent Rock outcrop; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Notter loam that is moist and 5 percent Redcreek cobbly loam. Also included are small areas of soils that receive 10 to 12 inches of precipitation and are on south-facing slopes on the lower part of ridges.

The Comodore soil is shallow and well drained. It formed in residuum and alluvium derived dominantly from basic and intermediate igneous rock. Typically, the surface layer is brown extremely cobbly clay loam about 6 inches thick. The underlying material, to a depth of 13 inches, is brown very cobbly clay loam. Igneous bedrock is at a depth of 13 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Comodore soil is moderate. Available water capacity is 1 to 2 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Comodore soil consists of an overstory of pinyon and juniper with an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important understory plants are black sagebrush, mountain big sagebrush, antelope bitterbrush, bluebunch wheatgrass, Indian ricegrass, and needleandthread. The suitability of the soil for rangeland seeding is very poor. The main limitations are restricted rooting depth and slope.

This map unit is in capability subclass VIIs, nonirrigated. The Comodore soil is in Upland Shallow Loam (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a woodland site.

40—Crestline fine sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on dissected alluvial fans south of Circle Valley. It formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are linear in shape and medium in length. The present vegetation in most areas is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is grayish brown, mildly alkaline fine sandy loam about 3 inches thick. The subsoil is brown, moderately alkaline fine sandy loam about 17 inches thick. The substratum to a depth of 60 inches or more is brown, moderately alkaline fine sandy loam.

Included in this unit are about 10 percent Broncho soils on the upper part of alluvial fans and Mikim loam that has slopes of 2 to 4 percent and is on valley plains.

Permeability of the Crestline soil is moderately rapid. Available water capacity is 7 to 8 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community is 55 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, bottlebrush squirreltail, and Nevada Mormon tea. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to the production of hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

The map unit is in capability units IIe-2, irrigated, and VIe, nonirrigated. It is in Semidesert Sandy Loam (Wyoming Big Sagebrush) (D28A) range site.

41—Dalcan very cobbly loam, dry, 4 to 25 percent slopes. This moderately deep, well drained soil is on mountainsides and dissected alluvial fans in the Dog Valley area. It formed in residuum derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex and are medium in length. The present vegetation in most areas is mainly mountain big sagebrush, blue grama, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown very cobbly loam about 4 inches thick. The upper 6 inches of the subsoil is dark grayish brown very gravelly clay loam, the next 5 inches is brown very gravelly clay, and the lower part to a depth of 22 inches is brown very cobbly clay loam. Igneous bedrock is at a depth of 22 inches. Depth to bedrock ranges from 20 to 40 inches.

Included in this unit are about 10 percent Harol very cobbly loam that has slopes of 15 to 40 percent and 5 percent Zillion very cobbly loam. Also included are small areas of Comodore extremely cobbly clay loam.

Permeability of this Dalcan soil is slow. Available water capacity is 1.5 to 2.5 inches. Water supplying capacity is 3.5 to 6.0 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and antelope bitterbrush. The suitability of the unit for rangeland seeding is poor. The main limitations are the depth to bedrock, the low available water capacity, and the very cobbly surface layer. Undesirable plants can be controlled by railing, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Upland Stony Loam range site.

42—Descot silt loam, dry, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains in the Widtsoe area of Johns Valley. The soil formed in alluvium derived dominantly from limestone and sandstone. Slopes are linear and long. The vegetation in areas not cultivated is mainly black sagebrush, winterfat, and grass. Elevation is 6,500 to 7,200 feet. The average annual precipitation is about 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pink, strongly alkaline silt loam about 5 inches thick. The underlying material to a depth of 60 inches or more is pink, strongly alkaline, stratified fine sandy loam and very fine sandy loam.

Included in this unit are about 5 percent Codley silt loam that has slopes of 1 to 2 percent, 5 percent Greenhalgh silt loam that has slopes of 2 to 5 percent, and 5 percent Bruman gravelly loam.

Permeability of this Descot soil is moderately rapid. Available water capacity is 8 to 10 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. It is also used for irrigated crops.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Indian ricegrass, needleandthread, winterfat, and blue grama. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Black Sagebrush) range site.

43—Descot silt loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains on the east side of Panguitch Valley, west of Casto and Red Canyons, and near the Garfield-Kane County line, along U.S. Highway 89. The soil formed in alluvium derived dominantly from limestone and sandstone. Slopes are linear and are medium in length. The present vegetation in most areas is mainly black sagebrush, winterfat, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pink silt loam about 5 inches thick. The underlying material to a depth of 60 inches or more is stratified, pink very fine sandy loam and fine sandy loam.

Included in this unit are about 10 percent Tebbs sandy loam and 5 percent Alldown clay loam that is moist.

Permeability of this Descot Silt is moderately rapid. Available water capacity is about 8 to 10 inches. Water supplying capacity is 7 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is about 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are mountain big sagebrush, Indian ricegrass, blue grama, winterfat, and bottlebrush squirreltail. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam range site.

44—Dimyaw Family gravelly loam, 4 to 25 percent slopes, eroded. These very deep, well drained soils are on structural benches and mountainsides east of Henrieville and in the Sheep Creek area. The soils formed in alluvium derived dominantly from shale. Slopes are convex in shape and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, serviceberry, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

No single profile is typical of the Dimyaw Family soils, but one commonly observed in the survey area has asurface layer that is grayish brown gravelly loam about 7 inches thick. The upper 20 inches of the underlying material is light gray clay loam, and the lower part to a depth of 60 inches or more is light gray clay.

Included in this unit are about 10 percent Ruko clay loam and 5 percent soils that are similar to these Dimyaw Family soils but have shale at a depth of 20 to 40 inches.

Permeability of the Dimyaw Family soils is slow. Available water capacity is 9.5 to 10.5 inches. Water supplying capacity is 8 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit consists of an overstory of pinyon and juniper and an understory of 30 percent grasses, 5 percent forbs, and 65 percent shrubs. Important understory plants are black sagebrush, Indian ricegrass, mountain big sagebrush, antelope bitterbrush, and blue grama. The suitability of the unit for rangeland seeding is poor. The main limitation is slope.

Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Clay (Pinyon-Juniper) woodland site.

45—Echard loam, 5 to 30 percent slopes. This very deep, well drained soil is on dissected alluvial fans and benches south of the right fork of Sanford Creek. This soil formed in alluvium derived dominantly from soft rhyolitic tuff or strongly cemented ash. Slopes are convex to concave in shape and are medium in length. The present vegetation is mainly ponderosa pine, Douglas fir, white fir, and aspen. Elevation is 8,500 to 8,900 feet. The average annual precipitation is 20 to 22 inches, the average annual air temperature is 38 to 41 degrees F, and the freeze-free period is 60 to 65 days.

Typically, the surface is covered with a mat of undecomposed and partly decomposed needles and twigs about 1 inch thick. The surface layer is gray loam about 5 inches thick. The upper 10 inches of the subsoil is grayish brown clay, and the lower 10 inches is light brownish gray clay loam and cobbly clay loam. The underlying material to a depth of 60 inches or more is pale brown cobbly loam.

Included in this unit are about 10 percent Behanin loam on steep, north-facing slopes, 5 percent Castino gravelly silt loam on south-facing slopes, and 2 percent Riverwash in intermittent stream channels.

Permeability of this Echard soil is very slow. Available water capacity is 7 to 9 inches. Water supplying capacity is 12 to 15 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used for wildlife habitat, watershed, woodland, and rangeland.

The potential plant community on this unit consists of an overstory of ponderosa pine, Douglas fir, white fir, and aspen and an understory of 50 percent grasses, 20 percent forbs, and 30 percent shrubs. Important understory plants are mountain brome, sedge, common juniper, mountain snowberry, bearded wheatgrass, and Oregon grape.

This unit has moderate potential for the production of commercial timber. The site index for Douglas fir and ponderosa pine ranges from 50 to 65 and for white fir it ranges from 45 to 60.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. The main concerns in producing and harvesting timber are a moderate rate of seedling mortality, plant competition, limited access, and the fine texture of the subsoil. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand.

This unit can produce 1,000 to 1,300 pounds of forage per acre in areas where the timber is removed.

This map unit is in capability subclass VIe, nonirrigated. It is in High Mountain Loam (Mixed Conifer) woodland site.

46—Ess-Callings association, 15 to 45 percent slopes. This map unit is on east-west oriented, long, narrow ridges, mainly in the drainageways surrounding Mount Dutton, on the Sevier Plateau. Slopes are convex to concave in shape and are short to medium in length. The present vegetation on the Ess soil is mainly grasses, and on the Callings soil it is mainly aspen. Elevation is 9,400 to 10,500 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 34 to 38 degrees F, and the freeze-free period is 50 to 60 days.

This unit is 45 percent Ess gravelly fine sandy loam, 25 to 45 percent slopes, on south exposures of ridges; 35 percent Callings loam, 15 to 30 percent slopes, on convex ridgetops; and 20 percent other soils.

Included in this unit is about 10 percent Behanin loam on steep, north-facing sides of ridges. Also included are about 5 percent Castino gravelly silt loam on south exposures below an elevation of 10,000 feet and 5 percent Winnemucca gravelly loam in parks and meadows.

The Ess soil is very deep and well drained. It formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown gravelly fine sandy loam about 11 inches thick. The subsoil is yellowish brown very cobbly clay loam and light yellowish brown extremely cobbly clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown extremely cobbly loam.

Permeability of the Ess soil is moderately slow. Available water capacity is 4 to 5 inches. Water supplying capacity is 9 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is slight.

The Callings soil is very deep and well drained. It formed in alluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the surface is covered with a mat of aspen leaves, twigs, and duff. The surface layer is very dark gray and dark brown loam about 11 inches thick. The subsurface layer is brown cobbly loam about 7 inches thick. The upper 14 inches of the subsoil is reddish brown very cobbly clay loam and very cobbly clay, and the lower 13 inches is reddish brown extremely cobbly clay loam. The substratum to a depth of 60 inches or more is yellowish red extremely gravelly clay loam.

Permeability of the Callings soil is slow. Available water capacity is 5 to 6 inches. Water supplying capacity is 10 to 13 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It is also used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Ess soil is 55 percent grasses, 25 percent forbs, and 20 percent shrubs. Important plants are mountain brome, bearded wheatgrass, and currant. The suitability of this soil for rangeland seeding is poor. The main limitations are slope and stones in the surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals. The Ess soil is susceptible to damage from overgrazing.

The potential plant community on the Callings soil consists of an overstory of aspen and an understory of 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Important understory plants are bearded wheatgrass, mountain brome, bluegrass, and mountain snowberry.

The Callings soil has moderate potential for the production of aspen. The site index for aspen ranges from 60 to 70. This soil has few limitations. Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

The Callings soil can produce 1,000 to 1,300 pounds of forage per acre in areas where the timber is removed.

The Ess soil is in capability subclass VIIe, nonirrigated, and the Callings soil is in capability subclass VIe, nonirrigated. The Ess soil is in High Mountain Loam range site, and the Callings soil is in High Mountain Loam (Aspen) woodland site.

47—Evanston loam, 2 to 8 percent slopes. This very deep, well drained soil is on valley plains and dissected alluvial fans in Johns Valley and near the town of Hatch. The soil formed in alluvium derived dominantly from sandstone and shale. Slopes are concave to convex in shape and are medium in length. The present vegetation is mainly crested wheatgrass in large areas that have been chained and seeded, and it is mainly black sagebrush and grasses in other areas. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown loam about 4 inches thick. The upper 11 inches of the subsoil is brown loam, and the lower 10 inches is light brownish gray loam. The upper 16 inches of the substratum is light brownish gray loam, and the lower part to a depth of 60 inches or more is very pale brown sandy loam. A layer of lime accumulation is at a depth of about 15 inches.

Included in this unit are about 10 percent Andys loam and 5 percent Notter loam that is moist.

Permeability of this Evanston soil is moderate. Available water capacity is 8 to 9 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are Indian ricegrass, black sagebrush, blue grama, antelope bitterbrush, and needleandthread. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

48—Evanston very cobbly loam, 4 to 25 percent slopes. This very deep, well drained soil is on mountainsides near Hatch. The soil formed in alluvium derived dominantly from sandstone and mixed igneous rock. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown very cobbly loam about 5 inches thick. The upper 10 inches of the subsoil is brown loam, and the lower 10 inches is light brownish gray loam. The upper 5 inches of the substratum is light brownish gray loam, the next 10 inches is very pale brown loam, and the lower part to a depth of 60 inches or more is very pale brown sandy loam. A layer of lime accumulation is at a depth of about 15 inches.

Included in this unit are about 10 percent Notter loam that is moist and 5 percent Ipson very cobbly loam.

Permeability of the Evanston soil is moderate. Available water capacity is 8.0 to 8.5 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are Indian ricegrass, black sagebrush, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitation is the very cobbly surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

49—Frandsen loam, dry, 1 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans and mountain foot slopes near the Pines Motel, in Johns Valley, and southeast of Hatch. The soil formed in alluvium and colluvium derived dominantly from sandstone, limestone, and shale. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is light brownish gray loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, pinkish gray, and pale brown loam. In some small areas the surface layer is stony loam and the potential plant community includes big sagebrush.

Included in this unit are about 10 percent Evanston loam in lower lying areas on alluvial fans and 5 percent Codley silt loam that has slopes of 2 to 5 percent and is on valley plains.

Permeability of this Frandsen soil is moderate. Available water capacity is 9 to 10 inches. Water supplying capacity is 6 to 9 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, antelope bitterbrush, and blue grama. The suitability of the unit for rangeland seeding is fair. The main limitation is steepness of slope. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

50—Frandsen-Neto association, 1 to 8 percent slopes. This map unit is on valley bottoms and alluvial fans of streams at the base of the Paunsaugunt Plateau. Shallow and deep gullies are present in this unit. Slopes are convex to concave and are medium to long. The present native vegetation is mainly big sagebrush. Elevation is 6,800 to 7,300 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 55 percent Frandsen loam, 3 to 8 percent slopes, on alluvial fans; 40 percent Neto sandy loam, 1 to 3 percent slopes, on bottom lands; and 5 percent other miscellaneous areas.

Included in this unit is about 5 percent Riverwash in drainageways.

The Frandsen soil is very deep and well drained. It formed in mixed alluvium derived dominantly from shale, limestone, and sandstone. Typically, the surface layer is pale brown loam about 2 inches thick. The upper 41 inches of the substratum is pale brown clay loam, and the lower part to a depth of 60 inches or more is very pale brown loam.

Permeability of the Frandsen soil is moderate. Available water capacity is 9 to 11 inches. Water supplying capacity is 8 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Neto soil is very deep and somewhat excessively drained. It formed in mixed alluvium derived dominantly from sandstone, limestone, and shale. Typically, the surface layer is brown sandy loam about 2 inches thick. The upper 36 inches of the underlying material is stratified, pale brown, light brown, and brown sandy loam, very gravelly loamy sand, and loamy sand, and the lower part to a depth of 60 inches or more is extremely gravelly loamy sand.

Permeability of the Neto soil is moderately rapid. Available water capacity is 4.0 to 5.5 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to rare periods of flooding.

This unit is used mainly as rangeland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on the Frandsen soil is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat.

The potential plant community on the Neto soil is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important plants are basin wildrye, western wheatgrass, Nevada bluegrass, and basin big sagebrush.

The suitability of this unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

The Frandsen soil is in capability subclass VIe, nonirrigated, and the Neto soil is in capability subclass VIs, nonirrigated. The Frandsen soil is in Upland Loam range site, and the Neto soil is in Loamy Bottom range site.

51—Frandsen, dry-Wiggler complex, 15 to 50 percent slopes. This map unit is on mountainsides and dissected alluvial fans in the Mammoth-Asay Creek and Hatch areas. Slopes are convex to concave and are medium in length. The present vegetation in most areas is mainly pinyon, juniper, shrubs, and grasses. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 55 percent Frandsen gravelly loam, 15 to 50 percent slopes; 40 percent Wiggler very cobbly loam, 15 to 50 percent slopes; and 5 percent other soils and miscellaneous areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Paunsaugunt gravelly loam that has slopes of 2 to 15 percent and small areas of Rock outcrop.

The Frandsen soil is very deep and well drained. It is on alluvial fans. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light reddish brown gravelly loam about 5 inches thick. The upper 19 inches of the underlying material is pink loam, and the lower part to a depth of 60 inches or more is pink clay loam.

Permeability of the Frandsen soil is moderate. Available water capacity is 9 to 10 inches. Water supplying capacity is 8 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Wiggler soil is shallow and well drained. It is on mountainsides. It formed in residuum and colluvium derived dominantly from shale. Typically, the surface layer is gray very cobbly loam about 7 inches thick. The upper 5 inches of the underlying material is light gray loam, and the lower part to a depth of 19 inches is light gray clay loam. Weathered shale is at a depth of 19 inches. Depth to shale ranges from 8 to 20 inches.

Permeability of the Wiggler soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community on the Frandsen soil is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, blue grama, needleandthread, and antelope bitterbrush.

The potential plant community on the Wiggler soil consists of an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are birchleaf mountainmahogany, Utah serviceberry, Mormon tea, Nevada bluegrass, and Fremont mahonia.

The suitability of this unit for rangeland seeding is very poor. The main limitations are the shallow depth of the Wiggler soil and slope.

This map unit is in capability subclass VIIe, nonirrigated. The Frandsen soil is in Upland Loam (Black Sagebrush) range site, and the Wiggler soil is in Upland Shallow Clay (Pinyon-Juniper) woodland site.

52—Fughes silty clay loam, 0 to 4 percent slopes. This very deep, well drained soil is in alluvial valleys in the Dog Valley area. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave and are medium in length. The present vegetation in most areas is mainly mountain big sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 15 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark brown silty clay loam about 4 inches thick. The upper 6 inches of the subsoil is dark grayish brown silty clay loam, the next 13 inches is dark brown silty clay, the next 30 inches is yellowish brown clay, and the lower part to a depth of 60 inches or more is yellowish brown clay loam.

Included in this unit are about 10 percent Dalcan very cobbly loam and 5 percent Harol very cobbly loam that has slopes of 2 to 15 percent.

Permeability of this Fughes soil is slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 8 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, mountain big sagebrush, blue grama, and bottlebrush squirreltail. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam range site.

53—Gerst Family-Rock outcrop complex, 20 to 70 percent slopes. This map unit is on mountainsides. Slopes are convex and short. The present vegetation in most areas is mainly shrubs and grasses with scattered pinyon and Utah juniper. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

This unit is 50 percent Gerst Family soils, 20 to 50 percent slopes; 35 percent Rock outcrop; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent soils that are similar to the Gerst Family soils but are 20 to 40 inches deep to bedrock and 5 percent Cannonville clay.

The Gerst Family soils are shallow and well drained. They formed in residuum derived dominantly from shale and sandstone. No single profile is typical of the Gerst Family soils, but one commonly observed in the survey area has a surface layer of reddish brown loam about 3 inches thick. The underlying material to a depth of 12 inches is reddish brown loam. Shale is at a depth of 12 inches. Depth to shale ranges from 10 to 20 inches.

Permeability of the Gerst Family soils is moderate. Available water capacity is 2.0 to 2.5 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of areas of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland and wildlife habitat.

The potential plant community on the Gerst Family soils is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Important plants are shadscale, black sagebrush, bottlebrush squirreltail, Indian ricegrass, and roundleaf buffaloberry. The suitability of the unit for rangeland seeding is very poor. The main limitations are low available water capacity and depth to bedrock.

This map unit is in capability subclass VIIs, nonirrigated. The Gerst Family soils are in Semidesert Shallow Clay (D35) range site. Rock outcrop is not placed in a range site.

54—Greenhalgh silt loam, 1 to 2 percent slopes. This very deep, well drained soil is on low-lying alluvial fans, north of Panguitch, south of Antimony, in Johns Valley, near Hatch, and west of the Bryce Canyon Airport. The soil formed in alluvium derived dominantly from mixed igneous and sedimentary rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly basin big sagebrush, winterfat, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown, moderately alkaline silt loam about 2 inches thick. The underlying material to a depth of 60 inches or more is brown, moderately alkaline silt loam.

Included in this unit are about 10 percent Alldown clay loam that has slopes of 1 to 2 percent and 5 percent Tebbs sandy loam.

Permeability of the Greenhalgh soil is moderate. Available water capacity is 10.0 to 11.5 inches. Water supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to rare periods of flooding.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are western wheatgrass, Indian ricegrass, basin big sagebrush, needleandthread, winterfat, and fourwing saltbrush. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Silt Loam range site.

55—Greenhalgh silt loam, 2 to 5 percent slopes. This very deep, well drained soil is on low-lying alluvial fans. It is north of Panguitch, near Hatch, and in Johns Valley. The soil formed in alluvium derived dominantly from mixed igneous and sedimentary rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly basin big sagebrush, winterfat, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown, moderately alkaline silt loam about 2 inches thick. The underlying material to a depth of 60 inches or more is brown, moderately alkaline silt loam.

Included in this unit are about 10 percent Alldown clay loam that has slopes of 2 to 5 percent and 5 percent Tebbs sandy loam.

Permeability of the Greenhalgh soil is moderate. Available water capacity is 10.0 to 11.5 inches. Water supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to rare periods of flooding.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are Indian ricegrass, basin big sagebrush, western wheatgrass, winterfat, and fourwing saltbrush. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is slope. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Silt Loam range site.

56—Grimm sandy loam, 1 to 5 percent slopes. This very deep, somewhat excessively drained soil is on dissected alluvial fans, high stream terraces, and valley plains in Panguitch Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly Wyoming big sagebrush, yellowbrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown and light brownish gray sandy loam about 8 inches thick. The upper 6 inches of the underlying material is gray extremely gravelly loamy sand, and the lower part to a depth of 60 inches or more is gray extremely gravelly sand.

Included in this unit are about 10 percent Tebbs sandy loam and 5 percent Notter gravelly coarse sandy loam.

Permeability of this Grimm soil is rapid. Available water capacity is 2 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitation is the low available water capacity. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIIs, nonirrigated. It is in Semidesert Gravelly Loam (Wyoming Big Sagebrush) South range site.

57—Guben gravelly loam, dry, 1 to 25 percent slopes. This very deep, well drained soil is on stream terraces in the upper end of Johns Valley. The soil formed in alluvium derived dominantly from mixed volcanic rock and some sedimentary rock. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown and grayish brown gravelly loam about 4 inches thick. The upper 10 inches of the subsoil is brown gravelly loam and very gravelly sandy clay loam, and the lower 8 inches is light gray extremely gravelly sandy clay loam. The upper 18 inches of the substratum is light gray extremely gravelly sandy clay loam, the next 4 inches is white very gravelly loam, and the lower part to a depth of 60 inches or more is light gray extremely gravelly sandy loam. A layer of lime accumulation is at a depth of about 22 inches.

Included in this unit is about 10 percent Panguitch gravelly sandy loam that has slopes of 2 to 5 percent and Andys loam.

Permeability of this Guben soil is moderate. Available water capacity is 4 to 6 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important plants are black sagebrush, Indian ricegrass, needleandthread, and antelope bitterbrush. The suitability of the unit for rangeland seeding is fair. The main limitations are the low available water capacity and the gravelly surface layer. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Black Sagebrush) range site.

58—Guben-Showalter complex, 2 to 30 percent slopes. This map unit is on pediments in the vicinity of Casto Bluff and north of Hunt Creek and its tributaries. Slopes are concave to convex and are medium to long. The present vegetation is mainly mountain big sagebrush, rabbitbrush, and some pinyon and juniper. Elevation is 7,500 to 8,400 feet. The average annual precipitation is 14 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 80 days.

This unit is 45 percent Guben gravelly loam, 2 to 20 percent slopes; 35 percent Showalter cobbly loam, 2 to 30 percent slopes; and 20 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Mitch silt loam in bottoms along intermittent stream channels and 10 percent Widtsoe gravelly sandy loam.

The Guben soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown and brown gravelly loam about 4 inches thick. The subsoil is brown gravelly loam and very gravelly sandy clay loam about 10 inches thick. The substratum to a depth of 60 inches or more is light gray extremely gravelly sandy loam. A layer of lime accumulation is between depths of 14 and 44 inches.

Permeability of the Guben soil is moderate. Available water capacity is 4 to 6 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Showalter soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is dark brown gravelly loam about 10 inches thick. The upper 7 inches of the subsoil is brown very gravelly clay loam, the next 13 inches is yellowish red very gravelly clay and very gravelly clay loam, and the lower 6 inches is light yellowish brown extremely gravelly sandy clay loam. The upper 12 inches of the substratum is pinkish white and brown gravelly loam, and the lower part to a depth of 60 inches or more is brown gravelly loam. A layer of lime accumulation is between depths of 30 and 48 inches.

Permeability of the Showalter soil is slow. Available water capacity is 5 to 7 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are mountain big sagebrush, Indian ricegrass, bluebunch wheatgrass, and antelope bitterbrush. The suitability of the unit for rangeland seeding is fair. The main limitations are the low available water capacity, slope, and the gravelly or cobbly surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIe, nonirrigated, and in Upland Stony Loam range site.

59—Harol very cobbly loam, 2 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans and mountainsides near Dog Valley, Coal Pit Wash, and Mammoth and Asay Creeks, west of Black Canyon; and west of Bryce Canyon Junction. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly mountain big sagebrush and grasses. Elevation is 7,300 to 8,300 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown very cobbly loam about 8 inches thick. The subsoil is brown very cobbly clay loam about 18 inches thick. The upper 19 inches of the substratum is grayish brown extremely cobbly loamy sand, and the lower part to a depth of 60 inches or more is light brownish gray extremely cobbly sand.

Included in this unit are about 10 percent Quilt very cobbly loam that has slopes of 4 to 25 percent and 5 percent Zillion soils.

Permeability of this Harol soil is moderately slow. Available water capacity is 3 to 5 inches. Water supplying capacity is 4.5 to 7.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are Indian ricegrass, antelope bitterbrush, blue grama, and mountain big sagebrush. The suitability of the unit for rangeland seeding is poor. The main limitation is the very cobbly surface layer. Undesirable plants can be controlled by railing, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Upland Stony Loam range site.

60—Harol very cobbly loam, 15 to 40 percent slopes. This very deep, well drained soil is on mountainsides. It is in the Dog Valley area, near Mammoth and Asay Creeks and west of Johns Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex in shape and are medium in length. The present vegetation in most areas is mainly mountain big sagebrush and grasses, but some small areas support pinyon and juniper. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark brown very cobbly loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 20 inches thick. The upper 15 inches of the substratum is brown extremely cobbly loamy sand, and the lower part to a depth of 60 inches or more is pale brown extremely cobbly sand.

Included in this unit are about 10 percent Dalcan very cobbly loam and 5 percent Tolman very cobbly silt loam.

Permeability of this Harol soil is moderately slow. Available water capacity is 3 to 5 inches. Water supplying capacity is 4.5 to 7.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are blue grama, Indian ricegrass, antelope bitterbrush, and mountain big sagebrush. The suitability of the unit for rangeland seeding is poor. The main limitation is the very cobbly surface layer. Undesirable plants can be controlled by railing, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Upland Stony Loam range site.

61—Harol very cobbly loam, moist, 25 to 50 percent slopes. This very deep, well drained soil is on mountainsides near Dog Valley, north of Coal Pit Wash, and southeast of Hatch. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are convex and are medium in length. The present vegetation in most areas is mainly mountain big sagebrush, mountain snowberry, and grasses. Elevation is 7,600 to 8,500 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 50 to 75 days.

Typically, the surface layer is very dark grayish brown very cobbly loam about 5 inches thick. The upper 10 inches of the subsoil is dark grayish brown very cobbly clay loam, and the lower 10 inches is brown very cobbly clay loam. The substratum to a depth of 60 inches or more is brown very cobbly clay loam.

Included in this unit are about 10 percent Harol very cobbly loam that has slopes of 15 to 40 percent and 5 percent Dalcan very cobbly loam. Also included are areas of Harol soils that have slopes of 50 to 60 percent.

Permeability of the Harol soil is moderately slow. Available water capacity is 5.0 to 6.5 inches. Water supplying capacity is 7 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are mountain brome, bluegrass, antelope bitterbrush, Gambel oak, and muttongrass. The suitability of the unit for rangeland seeding is poor. The main limitations are the very cobbly surface layer and slope. Undesirable plants can be controlled by burning or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Mountain Stony Loam range site.

62—Hatch-Pahreah complex, 5 to 25 percent slopes. This map unit is on benches and toe slopes between mesa tops and stream bottoms on the southern part of the Paunsaugunt Plateau. It is on north and east aspects at lower elevations and south and west aspects at higher elevations. Slopes are complex and are medium in length. The present vegetation is Douglas fir, ponderosa pine, white fir, and limber pine. Elevation is 8,500 to 9,300 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 70 days.

This unit is 65 percent Hatch loam, 5 to 25 percent slopes; 25 percent Pahreah gravelly loam, 5 to 25 percent slopes; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Sielo very fine sandy loam on bench tops and 5 percent Sheege gravelly sandy loam.

The Hatch soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from shale and siltstone. Typically, the surface is covered with a mat of conifer needles and twigs 0.5 inch thick. The surface layer is light brown loam about 2 inches thick. The subsoil is red clay loam and silty clay loam about 21 inches thick. The substratum is red silt loam about 13 inches thick over weathered siltstone. Bedrock is at a depth of 36 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Hatch soil is slow. Available water capacity is 5.5 to 6.5 inches. Water supplying capacity is 10 to 13 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Pahreah soil is moderately deep and somewhat excessively drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface is covered with a mat of undecomposed and partially decomposed conifer needles and twigs. The surface layer is brown very gravelly loam about 0.5 inch thick. The subsoil is brown very gravelly loam about 11 inches thick. The upper 14 inches of the substratum is pink and pinkish white extremely gravelly loam, and the lower part to a depth of about 38 inches is pinkish white extremely cobbly loam. Limestone is at a depth of 38 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Pahreah soil is moderate. Available water capacity is 2.0 to 3.5 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as wildlife habitat, watershed, recreation areas, and woodland.

The potential plant community on the Hatch soil consists of an overstory of Douglas fir and ponderosa pine and an understory of 45 percent grasses, 20 percent forbs, and 35 percent shrubs. Important understory plants are sedge, bearded wheatgrass, mountain brome, and mountain snowberry.

The Hatch soil has moderate potential for the production of commercial timber. The site index for Douglas fir and ponderosa pine ranges from 50 to 65; for white fir, 45 to 60; and for aspen, 60 to 70. This soil has a high rate of seedling mortality, has poor stability, and is subject to slumping.

The potential plant community on the Pahreah soil consists of an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 40 percent shrubs, and 15 percent forbs. Important understory plants are mountain brome, sedge, common juniper, and mountain snowberry.

The Pahreah soil has low potential for the production of commercial timber. The site index for ponderosa pine ranges from 35 to 50; for Douglas fir, 40 to 50; and for white fir, 35 to 45. This soil has a moderate rate of seedling mortality, and the rock fragments in the upper 12 inches may restrict the use of power augers when planting trees.

Conventional methods of harvesting timber on this unit generally are suitable, but the soils may be compacted if heavy equipment is used when the soils are moist. The main concerns in producing and harvesting timber are seedling mortality, plant competition, and the instability of the soils.

If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand.

In areas where the timber is removed, the Hatch soil can produce 1,000 to 1,300 pounds of forage per acre and the Pahreah soil can produce 400 to 700 pounds.

This map unit is in capability subclass VIIs, nonirrigated. The Hatch soil is in High Mountain Loam (Mixed Conifer) woodland site, and the Pahreah soil is in High Mountain Stony Loam (Mixed Conifer) woodland site.

63—Hatch-Swapps complex, 5 to 25 percent slopes. This map unit is on ridges and benches on the southern Paunsaugunt Plateau and in Bryce Canyon National Park. Slopes are complex and are medium in length. The present vegetation is mainly Douglas fir, ponderosa pine, white fir, and aspen. Elevation is 8,400 to 9,300 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 70 days.

This unit is 50 percent Hatch loam, 5 to 25 percent slopes; 25 percent Swapps gravelly loam, 5 to 25 percent slopes; and 25 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Hatch and Swapps soils that have a very cobbly surface layer, 10 percent soils that are similar to the Hatch and Swapps soils but are 40 to 60 inches deep to bedrock, 3 percent Pahreah very gravelly loam on toe slopes, and 2 percent Whiteman very cobbly very fine sandy loam that has slopes of 1 to 6 percent.

The Hatch soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from shale and siltstone. Typically, the surface is covered with a mat of conifer needles and twigs 0.5 inch thick. The subsurface layer is light brown loam about 2 inches thick. The subsoil is red clay loam and silty clay loam about 21 inches thick. The substratum is red silt loam about 13 inches thick over weathered siltstone. Weathered siltstone is at a depth of 36 inches. Depth to bedrock ranges from 20 to 38 inches.

Permeability of the Hatch soil is slow. Available water capacity is 6 to 7 inches. Water supplying capacity is 10 to 13 inches. Effective rooting depth is 20 to 38 inches. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Swapps soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from limestone and shale. Typically, the surface is covered with a mat of conifer needles and twigs 1 inch thick. The surface layer is brown gravelly loam about 3 inches thick. The subsoil is yellowish red gravelly loam about 5 inches thick. The upper 7 inches of the substratum is dark brown very gravelly loam, and the lower part to a depth of 23 inches is pink very gravelly loam. Limestone is at a depth of 23 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Swapps soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Hatch soil consists of an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 50 percent grasses, 20 percent forbs, and 30 percent shrubs. Important understory plants are mountain brome, sedge, bearded wheatgrass, meadowrue, and mountain snowberry. This soil has a high rate of seedling mortality, has poor stability, and is subject to slumping.

The potential plant community on the Swapps soil consists of an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are sedge, mountain brome, nodding bluegrass, mountain snowberry, and common juniper. This soil has a moderate rate of seedling mortality. The rock fragments in the upper 12 inches may restrict the use of power augers when planting trees.

This unit has moderate potential for the production of Douglas fir, ponderosa pine, and white fir. The Hatch soil also has moderate potential for the production of aspen. The site index for Douglas fir and ponderosa pine ranges from 50 to 65; for white fir, 45 to 60; and for aspen, 60 to 70.

Conventional methods of harvesting timber on this unit generally are suitable, but the soils may be compacted if heavy equipment is used when the soils are moist. The main concerns in producing and harvesting timber are seedling mortality, plant competition, and the instability of the soils.

If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand.

In areas where the timber is removed, the Hatch soil can produce 1,000 pounds of forage per acre and the Swapps soil can produce 700 pounds.

This map unit is in capability subclass VIe, nonirrigated. The Hatch soil is in High Mountain Loam (Mixed Conifer) woodland site, and the Swapps soil is in High Mountain Stony Loam (Mixed Conifer) woodland site.

64—Henrieville sandy loam, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Tropic and Henrieville areas. It formed in alluvium derived dominantly from sandstone and shale. Slopes are linear in shape and are medium in length. The vegetation in areas not cultivated is mainly big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray, moderately alkaline sandy loam about 12 inches thick. The upper 41 inches of the underlying material is light brownish gray and light gray, moderately alkaline sandy loam, and the lower part to a depth of 60 inches or more is light gray, moderately alkaline loamy sand. In some areas south of Henrieville, the surface layer is loam.

Included in this unit are about 10 percent Mikim loam that is dry and 5 percent Baldfield clay that has slopes of 2 to 4 percent. Also included are small areas of Mivida fine sandy loam in the Escalante area.

Permeability of this Henrieville soil is moderately rapid. Available water capacity is 5.5 to 7.0 inches. Water supplying capacity is 4.5 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as irrigated cropland. It is also used as rangeland and wildlife habitat.

If this unit is used for irrigated crops, the main limitation is the low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, needleandthread, sand dropseed, and galleta. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

The map unit is in capability subclasses IIe, irrigated, and VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

65—Henrieville sandy loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Tropic and Henrieville area. It formed in alluvium derived dominantly from sandstone and shale. Slopes are linear in shape and are medium in length. The vegetation in areas not cultivated is mainly big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray, moderately alkaline sandy loam about 5 inches thick. The upper 34 inches of the underlying material is grayish brown, moderately alkaline sandy loam, and the lower part to a depth of 60 inches or more is grayish brown, moderately alkaline loam.

Included in this unit are about 10 percent Mikim loam that is dry and 5 percent Baldfield clay that has slopes of 2 to 8 percent and is eroded.

Permeability of this Henrieville soil is moderately rapid. Available water capacity is 6 to 8 inches. Water supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as irrigated cropland. It is also used as rangeland and wildlife habitat.

If this unit is used for irrigated crops, the main limitations are slope and low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, needleandthread, sand dropseed, and galleta. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

66—Henrieville sandy loam, 5 to 10 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Henrieville. It formed in alluvium derived dominantly from sandstone and shale. Slopes are linear and long. The present vegetation in most areas is mainly basin big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray sandy loam about 12 inches thick. The upper 41 inches of the underlying material is light brownish gray and light gray sandy loam, and the lower part to a depth of 60 inches or more is light gray loamy sand.

Included in this unit are about 10 percent Henrieville sandy loam that has slopes of 2 to 5 percent and 5 percent Mikim clay loam that is dry.

Permeability of this Henrieville soil is moderately rapid. Available water capacity is 5.5 to 7.0 inches. Water supplying capacity is 4.5 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, needleandthread, sand dropseed, and galleta. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by railing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

67—Henrieville sandy loam, moist, 2 to 8 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Sheep Creek area, southwest of Cannonville. The soil formed in alluvium derived dominantly from sandstone and limestone. Slopes are linear and long. The present vegetation is mainly crested wheatgrass in large areas that have been chained and seeded, and it is mainly Wyoming big sagebrush and grasses in areas that have not been chained and seeded. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 100 days.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper 19 inches of the underlying material is pale brown loam, and the lower part to a depth of 60 inches or more is light gray sandy loam.

Included in this unit are about 10 percent Bayfield clay and 5 percent Mikim loam.

Permeability of this Henrieville soil is moderately rapid. Available water capacity is 6.5 to 8.0 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 5 percent forbs, and 35 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, blue grama, galleta, sand dropseed, and fourwing saltbush. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Drilling of seed is preferable and results in better stands of forage.

The map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (D35) range site.

68—Hernandez Family-Clapper complex, 2 to 8 percent slopes. This map unit is on fan terraces on Bulldog and Coal Benches. Slopes are linear to convex in shape and are medium in length. The present vegetation is mainly Russian wildrye, crested wheatgrass, and cliffrose in large areas that have been chained and seeded, and it is mainly pinyon, Utah juniper, birchleaf mountainmahogany, and grasses in areas that have not been chained and seeded. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 110 days.

This unit is 55 percent Hernandez Family soils, 2 to 4 percent slopes; 35 percent Clapper cobbly loam, 2 to 8 percent slopes, eroded; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Venture cobbly loam that has slopes of 4 to 30 percent and 5 percent Bruman cobbly loam that is moist and has slopes of 10 to 30 percent.

The Hernandez Family soils are very deep and well drained. They formed in alluvium derived dominantly from limestone and sandstone. No single profile of the Hernandez Family soils is typical, but one commonly observed in the survey area has a surface layer of brown loam about 3 inches thick. The subsoil is brown clay loam about 14 inches thick. The upper 13 inches of the substratum is light brown clay loam, and the lower part to a depth of 60 inches or more is reddish yellow clay loam. A layer of lime accumulation is at a depth of about 17 inches.

Permeability of the Hernandez Family soils is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

The Clapper soil is very deep and well drained. It formed in alluvium derived dominantly from limestone. Typically, the surface layer is brown cobbly loam about 3 inches thick. The subsoil is brown cobbly loam about 7 inches thick. The upper 10 inches of the substratum is brown very gravelly loam, and the lower part to a depth of 60 inches or more is pale brown and light yellowish brown very gravelly loam. A layer of lime accumulation is at a depth of about 10 inches.

Permeability of the Clapper soil is moderate. Available water capacity is 5 to 6 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

The potential plant community on the Hernandez Family soils is 60 percent grasses, 5 percent forbs, and 35 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, needleandthread, and blue grama. Some areas of these soils have an overstory of pinyon and Utah juniper. Drilling of seed is preferable and results in better stands of forage.

The potential plant community on the Clapper soil consists of an overstory of pinyon and juniper and an understory of 40 percent grasses, 5 percent forbs, and 55 percent shrubs. Important understory plants are rock goldenrod, green Mormon tea, Nevada bluegrass, muttongrass, and blue grama. The suitability of this soil for rangeland seeding is fair. The main limitation is low precipitation. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. The Hernandez Family soils are in Upland Loam (D35) range site, and the Clapper soil is in Upland Stony Loam (Pinyon-Juniper) (D35) woodland site.

69—Ipson cobbly loam, 8 to 25 percent slopes. This very deep, well drained soil is on fan terraces and hillsides in the Johns Valley-Antimony area and south of Circle Valley. The soil formed in alluvium derived dominantly from intermediate igneous rock. Slopes are rolling and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown cobbly loam about 6 inches thick. The subsoil is brown very cobbly loam 8 inches thick. The upper 11 inches of the substratum is very pale brown very gravelly loam, the next 11 inches is very pale brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light gray very gravelly sand. A layer of carbonate accumulation is at a depth of about 14 inches.

Included in this unit are about 10 percent Andys very cobbly loam and 5 percent Tridell very cobbly loam.

Permeability of the Ipson soil is moderate. Available water capacity is 3.5 to 5.0 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit consists of an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are mountain big sagebrush, black sagebrush, bluegrass, Indian ricegrass, blue grama, and antelope bitterbrush. The suitability of the unit for rangeland seeding is fair. The main limitations are the cobbly surface layer and slope.

Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

70—Ipson very cobbly loam, 25 to 60 percent slopes. This very deep, well drained soil is on mountainsides and hillsides in Johns Valley, near Circleville Canyon, and south of Circle Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are convex and short. The present vegetation in most areas is mainly pinyon, Utah juniper, black sagebrush, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark brown very cobbly loam about 3 inches thick. The subsoil is brown very cobbly loam 7 inches thick. The upper 7 inches of the substratum is pale brown very cobbly loam, the next 8 inches is light gray very cobbly loam, and the lower part to a depth of 60 inches or more is pale brown very cobbly loam. A layer of lime accumulation is at a depth of about 10 inches.

Included in this unit are about 10 percent Bruman cobbly loam that is moist and has slopes of 30 to 50 percent and 5 percent Andys very cobbly loam. Also included are small areas of Rock outcrop.

Permeability of this Ipson soil is moderate. Available water capacity is 5 to 7 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community consists of an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are mountain big sagebrush, black sagebrush, bluegrass, Indian ricegrass, blue grama, and antelope bitterbrush. The suitability of the unit for rangeland seeding is very poor. The main limitation is slope.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

71—Ipson very stony loam, dry, 5 to 25 percent slopes. This very deep, well drained soil is on hillsides and mountainsides in the Antimony and Hatch areas. The soil formed in alluvium derived dominantly from intermediate igneous rock. Slopes are convex and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is

9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown very stony loam about 4 inches thick. The subsoil is yellowish brown very cobbly loam 12 inches thick. The upper 22 inches of the substratum is light brownish gray very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light gray very cobbly sandy loam. A layer of lime accumulation is at a depth of about 16 inches.

Included in this unit are about 10 percent Tridell cobbly loam and 5 percent Redcreek cobbly loam. Also included are small areas of soils that have slopes of 25 to 40 percent.

Permeability of this Ipson soil is moderate. Available water capacity is 5 to 6 inches. Water supplying capacity is 4.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 40 percent grasses, 10 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, Indian ricegrass, Wyoming big sagebrush, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and the very stony surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Semidesert Stony Loam range site.

72—Jodero loam, 1 to 2 percent slopes. This very deep, well drained soil is on alluvial fans and valley plains in Panguitch and Johns Valleys, east of Hatch, and near Antimony. The soil formed in alluvium derived dominantly from intermediate and basic igneous rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown, neutral to mildly alkaline loam about 28 inches thick. The underlying material to a depth of 60 inches or more is dark grayish brown, mildly alkaline loam. In some small areas the surface layer is less than 16 inches thick.

Included in this unit are about 10 percent soils, near Panguitch, that are similar to this Jodero soil but have a water table at a depth of 20 to 40 inches and 5 percent Alldown clay loam that has slopes of 1 to 2 percent.

Permeability of this Jodero soil is moderate. Available water capacity is 9.5 to 10.5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to rare periods of flooding.

Most areas of this unit are used for irrigated crops. A few areas are used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are basin big sagebrush, Indian ricegrass, needleandthread, blue grama, Wyoming big sagebrush, western wheatgrass, and winterfat. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemical. Drilling of seed is preferable and results in better stands of forage.

Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. In some areas the supply of irrigation water is inadequate after midseason. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Basin Big Sagebrush) range site.

73—Jodero loam, moist, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and valley plains in the Upper Valley area, west of Escalante. The soil formed in alluvium derived dominantly from mixed igneous and sedimentary rock. Slopes are linear to slightly undulating and are long. The vegetation in areas not cultivated is mainly mountain big sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the average freeze-free period is 90 to 120 days.

Typically, the surface layer is dark grayish brown, moderately alkaline loam about 24 inches thick. The substratum to a depth of 60 inches or more is pale brown or brown, strongly alkaline loam.

Included in this unit are about 10 percent Alldown loam that is alkali and 5 percent Alldown clay loam that has slopes of 2 to 5 percent. Also included are small areas of soils, in the upper Boulder area, that have a thick dark grayish brown silty clay loam surface layer and a layer of lime accumulation in the subsoil; soils that have a brown loam to clay loam surface layer; soils that have a brown surface layer; and soils, in the upper Boulder area, that have slopes of 2 to 8 percent and have a layer of clay accumulation in the subsoil.

Permeability of the Jodero soil is moderate. Available water capacity is 9.5 to 11.0 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is subject to rare periods of flooding.

This unit is used for irrigated crops and as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitations are slope and the rare periods of flooding. Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Upland Loam range site.

74—Kade silt loam, 0 to 2 percent slopes. This very deep, poorly drained soil is on flood plains of the perennial streams in the lower elevations of the East Fork Sevier River area, on the Paunsaugunt Plateau. It formed in mixed alluvium derived dominantly from limestone, sandstone, and shale. Slopes are linear and long. The present vegetation is mainly sedges and grasses. Elevation is 7,600 to 8,200 feet. The average annual precipitation is 14 to 18 inches, the average annual air temperature is 35 to 42 degrees F, and the freeze-free period is 70 to 80 days.

Typically, the surface layer is very pale brown and light yellowish brown silt loam about 10 inches thick. The upper 22 inches of the underlying layer is light brownish gray silty clay, the next 8 inches is gray silt loam, and the lower part to a depth of 60 inches or more is grayish brown clay loam.

Included in this unit is about 10 percent very poorly drained soils that have a water table on or near the surface and are in wet meadows and in areas adjacent to springs or seeps.

Permeability of the Kade soil is very slow. Available water capacity is 10.0 to 11.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 4 to 6 percent. Runoff is very slow, and the hazard of water erosion is slight. This soil is subject to rare periods of flooding. A seasonal high water table fluctuates between depths of 12 and 36 inches in most years.

This unit is used as rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 90 percent grasses, 5 percent forbs, and 5 percent shrubs. Important plants are sedges, basin wildrye, Kentucky bluegrass, and redtop. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by spraying with chemicals.

This map unit is in capability subclass Vw, nonirrigated. It is in Semi-Wet Fresh Meadow range site.

75—Lava flows. This map unit consists of areas that are covered with basalt, mainly in the Mammoth and Assay Creek areas. The areas of Lava flows have sharp, jagged, rough, angular blocks. They have many cracks and crevices that collect small amounts of soil material, but they are virtually barren, except for mosses and lichens. Slopes are moderately steep to very steep. Because of the rough surface, areas of Lava flows are not used by livestock. They have limited value as wildlife habitat.

Included are small areas of medium textured soils that are 10 to 20 inches deep to lava.

This map unit is in capability class VIII, nonirrigated. It is not placed in a range site.

76—Lazear-Rock outcrop-Badland complex, 8 to 20 percent slopes. This map unit is on mesas and mountainsides east and northeast of Henrieville. Slopes are convex in shape and are medium in length. The present vegetation in most areas is mainly pinyon, juniper, shrubs, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is about 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 100 days.

This unit is 45 percent Lazear gravelly sandy loam, 8 to 20 percent slopes; 25 percent Rock outcrop; 15 percent Badland; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent soils that are similar to the Lazear soil but have bedrock at a depth of 20 to 40 inches and 5 percent sandy soils that are 10 to 20 inches deep to bedrock. Also included are small areas of Cannonville clay that have slopes of 30 to 50 percent.

The Lazear soil is shallow and well drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is pale brown gravelly sandy loam about 3 inches thick. The underlying material to a depth of 14 inches is light yellowish brown loam. Sandstone is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Lazear soil is moderate. Available water capacity is 2.0 to 2.5 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

Badland is steep or very steep, barren areas of shale that are dissected by many intermittent drainageways. Badland commonly is semiarid. Potential runoff is very high, and erosion is active.

This unit has limited use as rangeland, woodland, and wildlife habitat.

The potential plant community on the Lazear soil consists of an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are Indian ricegrass, Bigelow sagebrush, and galleta. The suitability of the unit for rangeland seeding is very poor. The main limitations are depth to sandstone and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. The Lazear soil is in Upland Shallow Loam (Pinyon-Juniper) (D35) woodland site. Rock outcrop and Badland are not placed in a woodland site.

77—Losee gravelly loam, 3 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans adjacent to the streams of the East Fork Sevier River. The soil formed in mixed alluvium derived dominantly from limestone, sandstone, and shale. Slopes are convex in shape and are medium in length. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,000 to 8,500 feet. The average annual precipitation is 14 to 20 inches, the average annual air temperature is 37 to 41 degrees F, and the freeze-free period is 60 to 75 days.

Typically, the surface layer is reddish brown gravelly loam about 4 inches thick. The upper 5 inches of the subsoil is reddish brown gravelly clay loam, and the lower 8 inches is yellowish red very gravelly sandy clay loam. The substratum to a depth of 60 inches or more is reddish yellow extremely gravelly loam.

Included in this unit are about 10 percent Losee gravelly sandy loam and 5 percent Ahlstrom silt loam on the lower part of alluvial fans.

Permeability of the Losee soil is moderately slow. Available water capacity is 4 to 6 inches. Water supplying capacity is 7 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used for wildlife habitat, watershed, recreation areas, and rangeland.

The potential plant community on this unit consists of an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are sedge, mountain brome, mountain snowberry, and common juniper.

This unit has moderate potential for the production of commercial timber. The site index for ponderosa pine and Douglas fir ranges from 50 to 65, and for white fir it ranges from 45 to 60.

This unit has few limitations. Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand.

This unit can produce 700 to 1,000 pounds of forage per acre in areas where the timber is removed.

This map unit is in capability subclass VIe, nonirrigated. It is in High Mountain Stony Loam (Mixed Conifer) woodland site.

78—Losee gravelly sandy loam, dry, 10 to 25 percent slopes. This very deep, well drained soil is on dissected alluvial fans adjacent to the streams of the East Fork Sevier River. The soil formed in mixed alluvium derived dominantly from limestone, sandstone, and shale. Slopes are convex in shape and are medium in length. The present vegetation is mainly black sagebrush, rabbitbrush, and grasses. Elevation is 8,000 to 8,500 feet. The average annual precipitation is 14 to 20 inches, the average annual air temperature is 37 to 41 degrees F, and the freeze-free period is 60 to 75 days.

Typically, the surface layer is reddish brown gravelly sandy loam about 4 inches thick. The upper 5 inches of the subsoil is reddish brown gravelly clay loam, and the lower 8 inches is yellowish red very gravelly sandy clay loam. The substratum to a depth of 60 inches or more is reddish yellow and yellowish red extremely gravelly loam.

Included in this unit are about 10 percent Losee gravelly loam on the upper part of alluvial fans, 5 percent Ahlstrom silt loam, and 5 percent Neto fine sandy loam on the lower part of alluvial fans.

Permeability of the Losee soil is moderately slow. Available water capacity is 4 to 6 inches. Water supplying capacity is 7 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are mountain brome, muttongrass, bluegrass, antelope bitterbrush, and Gambel oak. The suitability of the unit for rangeland seeding is fair. The main limitations are the low available water capacity, slope, and the gravelly surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals. Areas where brush is managed by mechanical methods may be subject to a greater risk of erosion. Where mechanical treatment is used, it should be done on the contour.

This map unit is in capability subclass VIe, nonirrigated. It is in Mountain Stony Loam range site.

79—Losee very gravelly loam, 30 to 60 percent slopes. This very deep, well drained soil is on mountainsides in the southern part of Bryce Canyon National Park. The soil is dominantly on south-facing slopes, but it occurs on other aspects at lower elevations. It formed in colluvium derived dominantly from limestone, sandstone, and shale. Slopes are complex and short. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,000 to 8,950 feet. The average annual precipitation is 14 to 20 inches, the average annual air temperature is 37 to 41 degrees F, and the freeze-free period is 60 to 75 days.

Typically, the surface layer is reddish brown very gravelly loam about 4 inches thick. The subsoil is reddish brown very cobbly clay loam about 8 inches thick. The substratum to a depth of 60 inches or more is reddish yellow extremely cobbly loam.

Included in this unit are 5 percent Hatch loam that has slopes of 5 to 25 percent, 5 percent Pahreah very gravelly loam that has slopes of 25 to 65 percent, 5 percent deep, grayish brown very stony loam, and 5 percent Rock outcrop.

Permeability of this Losee soil is moderately slow. Available water capacity is 4 to 6 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit consists of an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are sedge, mountain brome, mountain snowberry, and common juniper.

This unit has moderate potential for the production of commercial timber. The site index for ponderosa pine and Douglas fir ranges from 50 to 65, and for white fir it ranges from 45 to 60.

The main concerns in producing and harvesting timber are steepness of slope, rock fragments in the surface layer, and plant competition. Conventional methods of harvesting timber can be used in areas that have slopes of less than 45 percent and in steeper areas where slopes are 200 feet long or less. In areas where slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

This unit can produce 700 to 1,000 pounds of forage per acre if the timber is removed.

This unit is fair as a storage area for winter moisture, which can be released slowly in spring.

This map unit is in capability subclass VIIe, nonirrigated. It is in High Mountain Stony Loam (Mixed Conifer) woodland site.

80—Luhon loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the area from lower Johns Valley to Antimony, in the Panguitch-Hatch area, and south of Circle Valley. The soil formed in alluvium derived dominantly from intermediate igneous rock. Slopes are linear to slightly undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline loam about 12 inches thick. The upper 36 inches of the underlying material is light yellowish brown, strongly alkaline loam, and the lower part to a depth of 60 inches or more is very pale brown, moderately alkaline gravelly sandy loam. A layer of lime accumulation is at a depth of about 12 inches.

Included in this unit are about 5 percent Bruman loam, 5 percent Tridell loam, and 5 percent Alldown clay loam that has slopes of 1 to 2 percent.

Permeability of the Luhon soil is moderate. Available water capacity is 8.0 to 9.5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland and wildlife habitat. It is also used for irrigated crops.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Indian ricegrass, bottlebrush squirreltail, needleandthread, blue grama, and winterfat. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is slope. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Black Sagebrush) range site.

81—Luhon loam, gravelly substratum, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Antimony Bench area. The soil formed in alluvium derived dominantly from intermediate igneous rock. Slopes are linear in shape and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline loam about 6 inches thick. The subsoil is pale brown, moderately alkaline loam 23 inches thick. The upper 17 inches of the substratum is light gray, moderately alkaline cobbly loam, and the lower part to a depth of 60 inches or more is light gray, moderately alkaline very cobbly sandy loam. A layer of lime accumulation is at a depth of about 29 inches.

Included in this unit are about 5 percent Bruman loam, 5 percent Alldown clay loam that has slopes of 2 to 5 percent, and 5 percent Tebbs loam.

Permeability of the Luhon soil is moderate. Available water capacity is 7.5 to 8.5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used for irrigated crops. A few areas are used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Indian ricegrass, bottlebrush squirreltail, needleandthread, blue grama, and winterfat. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation.

Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to the production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Black Sagebrush) range site.

82—Luhon loam, gravelly substratum, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Antimony Bench area and east of Panguitch. The soil formed in alluvium derived dominantly from intermediate igneous rock. Slopes are linear and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline loam about 6 inches thick. The subsoil is pale brown, moderately alkaline loam 23 inches thick. The upper 17 inches of the substratum is light gray, moderately alkaline cobbly loam, and the lower part to a depth of 60 inches or more is light gray, moderately alkaline very cobbly sandy loam. A layer of lime accumulation is at a depth of about 29 inches.

Included in this unit are about 5 percent Bruman loam, 5 percent Alldown clay loam that has slopes of 2 to 5 percent, and 5 percent Tebbs loam.

Permeability of the Luhon soil is moderate. Available water capacity is 7.5 to 8.5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

Most areas of this unit are used for irrigated crops. A few areas are used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Indian ricegrass, bottlebrush squirreltail, needleandthread, blue grama, and winterfat. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is slope. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Black Sagebrush) range site.

83—Luhon loam, moist, 3 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Johns Valley area and in the area southeast of Hatch. The soil formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown loam 6 inches thick. The subsoil is light brown loam 6 inches thick. The upper 29 inches of the substratum is pink and pinkish white loam, and the lower part to a depth of 60 inches or more is light brown loam. A layer of lime accumulation is at a depth of about 12 inches.

Included in this unit are about 5 percent Greenhalgh silt loam that has slopes of 2 to 5 percent, 5 percent Andys loam, and 5 percent Frandsen loam that is dry.

Permeability of the Luhon soil is moderate. Available water capacity is 9 to 10 inches. Water supplying capacity is 7 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, blue grama, antelope bitterbrush, and needleandthread. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

84—Luhon very cobbly sandy loam, 2 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans and fan terraces in the Antimony, Panguitch, and Hatch areas; north of Bryce Canyon Junction; and south of Circle Valley. The soil formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is

40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown very cobbly sandy loam about 4 inches thick. The subsoil is brown gravelly loam 6 inches thick. The upper 15 inches of the substratum is white gravelly loam, the next 29 inches is light gray loam, and the lower part to a depth of 60 inches or more is light brownish gray sandy loam. A layer of lime accumulation is at a depth of about 10 inches.

Included in this unit are about 10 percent Bruman gravelly loam and 5 percent Greenhalgh silt loam that has slopes of 2 to 5 percent.

Permeability of this Luhon soil is moderate. Available water capacity is 8 to 9 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Indian ricegrass, bottlebrush squirreltail, needleandthread, blue grama, and winterfat. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and the very cobbly surface layer. Undesirable plants can be controlled by railing, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Semidesert Loam (Black Sagebrush) range site.

85—Mespun loamy fine sand, 1 to 3 percent slopes. This very deep, excessively drained soil is on windblown hills, undulating benches, and dissected alluvial fans near Boulder. The soil formed in eolian material derived dominantly from sandstone. Slopes are long. The vegetation in areas not cultivated is mainly big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 120 to 140 days.

Typically, the surface layer is brown, mildly alkaline loamy fine sand about 6 inches thick. The underlying material to a depth of 60 inches or more is strong brown and reddish yellow, mildly alkaline loamy fine sand. In some areas the surface layer is loam.

Included in this unit are about 10 percent Yarts loam and 5 percent Riverwash. Also included are areas of Mespun soils that have slopes of 3 to 8 percent.

Permeability of this Mespun soil is rapid. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly for irrigated crops and pasture. It is also used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 15 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, needleandthread, fourwing saltbush, and sandhill muhly. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation, low available water capacity, and the loamy fine sand texture of the surface layer. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals.

If this unit is used for irrigated crops, the main limitation is the low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content.

This map unit is in capability subclasses IIs, irrigated, and VIs, nonirrigated. It is in Semidesert Sand (D35) range site.

86—Mespun loamy fine sand, 3 to 8 percent slopes. This very deep, excessively drained soil is on windblown hills and benches near Boulder. The soil formed in eolian material derived dominantly from sandstone. Slopes are medium to long and are undulating. The vegetation in areas not cultivated is mainly big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 120 to 140 days.

Typically, the surface layer is brown, mildly alkaline loamy fine sand about 6 inches thick. The underlying material to a depth of 60 inches or more is strong brown and reddish yellow, mildly alkaline loamy fine sand.

Included in this unit are about 5 percent coarse textured soils that have slopes of 15 to 40 percent and are on the sides of ridges, 5 percent Yarts loam, and 5 percent Yarts sandy loam that has slopes of 2 to 5 percent. Also included are Mespun soils that have slopes of 1 to 3 percent or 8 to 15 percent.

Permeability of this Mespun soil is rapid. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is severe.

This unit is used mainly for irrigated crops and pasture. It is also used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 15 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, needleandthread, fourwing saltbush, and sandhill muhly. The suitability of this unit for rangeland seeding is poor. The main limitations are low precipitation, low available water capacity, and the loamy fine sand texture of the surface layer. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals.

If this unit is used for irrigated crops, the main limitation is the low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content.

This map unit is in capability subclasses IIIs, irrigated, and VIs, nonirrigated. It is in Semidesert Sand (D35) range site.

87—Mespun loamy fine sand, 8 to 15 percent slopes. This very deep, excessively drained soil is on windblown hills, undulating benches, and dissected alluvial fans near Boulder. The soil formed in eolian material derived dominantly from sandstone. Slopes are concave to convex and are medium in length. The vegetation in areas not cultivated is mainly big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 11 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 120 to 140 days.

Typically, the surface layer is brown, mildly alkaline loamy fine sand about 6 inches thick. The underlying material to a depth of 60 inches or more is strong brown and reddish yellow, mildly alkaline loamy fine sand. Some areas have slopes of 1 to 8 percent.

Included in this unit are about 5 percent Yarts sandy loam that has slopes of 5 to 10 percent and 5 percent Rock outcrop. Also included are small areas of Riverwash and Mespun soils that have slopes of 15 to 40 percent slopes and have a stony surface layer.

Permeability of this Mespun soil is rapid. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is severe.

This unit is used mainly as rangeland and wildlife habitat. It is also used for irrigated crops and pasture.

The potential plant community on this unit is 55 percent grasses, 15 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, needleandthread, fourwing saltbush, and sandhill muhly. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation, low available water capacity, and the loamy fine sand texture of the surface layer. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals.

If this unit is used for irrigated crops, the main limitations are slope and the low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content.

This map unit is in capability subclasses IVs, irrigated, and VIs, nonirrigated. It is in Semidesert Sand (D35) range site.

88—Mikim sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on benches and fan terraces south and east of Henrieville; on Coal and Bulldog Benches, northeast of Tropic; and in the Sheep Creek Area. The soil formed in alluvium derived dominantly from sandstone and shale. Slopes are concave to convex and are short. The present vegetation in most areas is mainly antelope bitterbrush, big sagebrush, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper 9 inches of the underlying material is pale brown loam, and the lower part to a depth of 60 inches or more is pale brown, light brownish gray and very pale brown clay loam.

Included in this unit are about 10 percent soils that are similar to this Mikim soil but have a gravelly substratum and 5 percent Yenlo loam.

Permeability of this Mikim soil is moderately slow. Available water capacity is 9.5 to 10.5 inches. Water supplying capacity is 7 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 5 percent forbs, and 35 percent shrubs. Important plants are Wyoming big sagebrush, needleandthread, Indian ricegrass, and blue grama. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (D35) range site.

89—Mikim loam, dry, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans near the town of Tropic. The soil formed in alluvium derived dominantly from sandstone and shale. Slopes are linear in shape and are medium in length. The vegetation in areas not cultivated is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray, moderately alkaline loam about 3 inches thick. The underlying material to a depth of 60 inches or more is very pale brown and pale brown, moderately alkaline loam.

Included in this unit are about 5 percent Mikim clay loam that is dry and has slopes of 1 to 2 percent, 5 percent Henrieville sandy loam that has slopes of 1 to 2 percent, and 5 percent Baldfield clay that has slopes of 2 to 4 percent. Also included are soils in an area along Henrieville Creek that are occasionally flooded.

Permeability of this Mikim soil is moderately slow. Available water capacity is 9 to 11 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for irrigated crops, rangeland, and wildlife habitat.

This unit is suited to production of hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit. In some areas the supply of irrigation water is inadequate after midseason. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, winterfat, galleta, and bottlebrush squirreltail. The suitability of the unit for rangeland seeding is poor. The main limitation is the low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclasses IIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (D35) range site.

90—Mikim loam, 2 to 4 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Salt Gulch area, west of Boulder. It formed in alluvium derived dominantly from sandstone and shale. Slopes are long and linear. The vegetation in areas not cultivated is mainly Wyoming big sagebrush and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 100 to 120 days.

Typically, the surface layer is brown, mildly alkaline loam about 5 inches thick. The upper 9 inches of the underlying material is pale brown, moderately alkaline loam, and the lower part to a depth of 60 inches or more is pale brown, moderately alkaline clay loam. In some areas the surface layer is clay loam and is 1 to 3 percent organic matter.

Included in this unit are about 10 percent soils that are similar to this Mikim soil but are sandy loam throughout the profile and 5 percent Yenlo loam.

Permeability of this Mikim soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for irrigated crops and as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 5 percent forbs, and 35 percent shrubs. Important plants are blue grama, Indian ricegrass, needleandthread, and Wyoming big sagebrush. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer and excessive runoff.

This map unit is in capability subclasses IIe, irrigated, and VIe, nonirrigated. It is in Upland Loam (D35) range site.

91—Mikim clay loam, dry, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans near the town of Tropic. The soil formed in alluvium derived dominantly from sandstone and shale. Slopes are linear in shape and are medium in length. The vegetation in areas not cultivated is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray, strongly alkaline clay loam about 4 inches thick. The upper 16 inches of the underlying material is light brownish gray, strongly alkaline clay loam, the next 14 inches is light brownish gray, strongly alkaline sandy clay loam, and the lower part to a depth of 60 inches or more is light yellowish brown, strongly alkaline clay loam.

Included in this unit are about 10 percent Henrieville sandy loam that has slopes of 1 to 2 percent and 5 percent Baldfield clay that has slopes of 2 to 4 percent.

Permeability of the Mikim soil is moderately slow. Available water capacity is 10.0 to 11.5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for irrigated crops, rangeland, and wildlife habitat.

This unit is suited to the production of hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, galleta, winterfat, and bottlebrush squirreltail. The suitability of the unit for rangeland seeding is poor. The main limitation is the low precipitation. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclasses IIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (D35) range site.

92—Mikim clay loam, dry, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans near the town of Tropic. It formed in alluvium derived dominantly from sandstone and shale. Slopes are linear in shape and are medium in length. The vegetation in areas not cultivated is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray, strongly alkaline clay loam about 4 inches thick. The upper 16 inches of the underlying material is light brownish gray, strongly alkaline clay loam, the next 14 inches is light brownish gray, strongly alkaline sandy clay loam, and the lower part to a depth of 60 inches or more is light yellowish brown, strongly alkaline clay loam.

Included in this unit are about 10 percent Henrieville sandy loam that has slopes of 2 to 5 percent and 5 percent Baldfield clay that has slopes of 2 to 4 percent. Also included are small areas of Mikim loam that is dry.

Permeability of this Mikim soil is moderately slow. Available water capacity is 10.0 to 11.5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for irrigated crops and as rangeland and wildlife habitat.

This unit is suited to production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, winterfat, galleta, and bottlebrush squirreltail. The suitability of the unit for rangeland seeding is poor. The main limitation is the low precipitation. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (D35) range site.

93—Mitch silt loam, 0 to 3 percent slopes. This very deep, well drained soil is on bottom lands and flood plains adjacent to the streams between Cottonwood Creek and Prospect Creek, in the east-central part of the survey area. The soil formed in mixed alluvium derived dominantly from intermediate volcanic rock. Slopes are flat and long. The present vegetation is mainly basin big sagebrush. Elevation is 6,900 to 8,300 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 95 days.

Typically, the surface layer is grayish brown silt loam over dark grayish brown loam about 4 inches thick. The substratum to a depth of 60 inches or more is stratified, dark grayish brown to light brownish gray silt loam to very fine sandy loam.

Included in this unit are about 10 percent soils that are similar to this Mitch soil but are clayey and are in depressional areas.

Permeability of this Mitch soil is moderate. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is subject to rare periods of flooding.

This unit is used mainly as rangeland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important plants are basin wildrye, western wheatgrass, Nevada bluegrass, and basin big sagebrush. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIc, nonirrigated. It is in Loamy Bottom range site.

94—Mitch-Riverwash association, 0 to 3 percent slopes. This map unit is on valley bottoms adjacent to many of the streams that drain the Sevier Plateau. Slopes are linear and long. The present vegetation is mainly basin big sagebrush. Elevation is 6,900 to 8,300 feet. The average annual precipitation is 10 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 95 days.

This unit is 50 percent Mitch silt loam, 0 to 3 percent slopes, and 40 percent Riverwash.

Included in this unit are about 10 percent Guben gravelly loam on alluvial fans and toe slopes.

The Mitch soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown silt loam over dark grayish brown loam about 4 inches thick. The substratum to a depth of 60 inches or more is stratified, dark grayish brown to light brownish gray silt loam to very fine sandy loam.

Permeability of this Mitch soil is moderate. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. This unit is subject to rare periods of flooding.

Riverwash consists of areas of deep, unconsolidated, stratified, gravelly and cobbly volcanic alluvium recently deposited by streams.

This unit is used mainly as rangeland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on the Mitch soil is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important plants are basin wildrye, western wheatgrass, Nevada bluegrass, and basin big sagebrush. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

Riverwash is unsuited for most management practices because it is extremely gravelly and cobbly and is subject to frequent changes in streamflow. It has potential for use as roadfill or as a source of gravel.

The Mitch soil is in capability subclass VIc, nonirrigated, and Riverwash is in capability class VIII. The Mitch soil is in Loamy Bottom range site. Riverwash is not placed in a range site.

95—Mivida fine sandy loam, 2 to 10 percent slopes. This very deep, well drained soil is on alluvial fans near Escalante. It formed in mixed alluvial and eolian material derived dominantly from sandstone. Slopes are long and are convex to concave. The vegetation in areas not cultivated is mainly big sagebrush and grasses. Elevation is 6,000 to 6,400 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 120 to 140 days.

Typically, the surface layer is brown, moderately alkaline fine sandy loam about 4 inches thick. The upper 9 inches of the subsoil is strong brown, moderately alkaline fine sandy loam, and the lower 38 inches is light brown, strongly alkaline fine sandy loam. The substratum to a depth of 60 inches or more is strong brown and yellowish red, strongly alkaline fine sandy loam.

Included in this unit are about 10 percent Barx fine sandy loam, 10 percent medium textured soils that have a loam surface layer, 3 percent Mikim loam that is dry and has slopes of 1 to 2 percent, and 2 percent Henrieville sandy loam that has slopes of 1 to 2 percent.

Permeability of this Mivida soil is moderately rapid. Available water capacity is 6.0 to 7.8 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as rangeland and wildlife habitat. A few areas are used for irrigated crops.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, galleta, needleandthread, and Mormon tea. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to production of hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit.

This map unit is in capability subclasses IIe, irrigated, and VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

96—Neto fine sandy loam, 1 to 5 percent slopes. This very deep, somewhat excessively drained soil is mainly on bottom lands and alluvial fans along the streams between Red Canyon and Hillsdale Canyon. Some areas are near Showalter Creek and Prospect Creek and on fans in the vicinity of Inspiration Point and Paria View, in Bryce Canyon National Park. The soil formed in mixed alluvium derived dominantly from sandstone, limestone, and shale. Slope is 1 to 5 percent. Slopes are linear and long. The present native vegetation is mainly basin big sagebrush. Elevation is 6,900 to 8,200 feet. The average annual precipitation is 13 to 18 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 75 to 95 days.

Typically, the surface layer is brown fine sandy loam about 2 inches thick. The upper 36 inches of the underlying material is stratified, pale brown, light brown, and brown sandy loam to loamy sand, and the lower part to a depth of 60 inches or more is pale brown extremely gravelly loamy sand. In the southern part of the survey area are areas of steeper Neto soils.

Included in this unit are about 5 percent Brycan very fine sandy loam that has slopes of 1 to 6 percent and is on narrow bottom lands, 5 percent Kade soils in wet depressional areas, and 5 percent Riverwash near stream channels.

Permeability of this Neto soil is moderately rapid. Available water capacity is 4.0 to 5.5 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is subject to rare periods of flooding.

This unit is used as rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important plants are basin wildrye, western wheatgrass, Nevada bluegrass, and basin big sagebrush. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Loamy Bottom range site.

97—Neto very fine sandy loam, wet, 0 to 2 percent slopes. This very deep, moderately well drained soil is on flood plains in Panguitch Valley. The soil formed in alluvium derived dominantly from mixed sedimentary rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown very fine sandy loam about 9 inches thick. The upper 12 inches of the underlying material is pale brown very fine sandy loam, the next 14 inches is pale brown fine sandy loam, and the lower part to a depth of 60 inches or more is light gray silt loam.

Included in this unit are about 10 percent Villy Family soils in areas adjacent to streams and 5 percent Jodero loam in higher lying areas.

Permeability of this Neto soil is moderately rapid. Available water capacity is 9 to 10 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight. A water table is at a depth of 3.5 to 5.0 feet during May through October.

This unit is used mainly as irrigated cropland and wildlife habitat. It is also used as rangeland.

This unit is suited to production of hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the soil in this unit. Water should be applied in amounts large enough to wet the root zone but small enough to minimize the leaching of plant nutrients. Irrigation water needs to be applied carefully to prevent the buildup of a high water table. Drainage may also be needed. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The potential plant community on this unit is 90 percent grasses, 5 percent forbs, and 5 percent shrubs. Important plants are sedges, basin wildrye, Kentucky bluegrass, and western wheatgrass. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

The map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in Semiwet Fresh Meadow range site.

98—Notter loam, 1 to 4 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the Panguitch Valley, mainly west of the Sevier River and near Hatch. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are slightly undulating and are medium in length. The vegetation in areas not cultivated is mainly Wyoming big sagebrush, black sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown, mildly alkaline loam about 5 inches thick. The subsoil is brown, mildly alkaline gravelly clay loam 9 inches thick. The upper 15 inches of the substratum is light gray, moderately alkaline very gravelly sandy loam, and the lower part to a depth of 60 inches or more is gray, moderately alkaline very gravelly sand. A layer of lime accumulation is at a depth of about 14 inches.

Included in this unit are about 10 percent Notter gravelly loam and 5 percent Tridell loam. Also included are soils that are similar to this Notter soil but that support basin big sagebrush and are in depressional areas.

Permeability of this Notter soil is moderate. Available water capacity is 4 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is the low available water capacity. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the soil in this unit. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

The map unit is in capability subclasses IIIs, irrigated, and VIs, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

99—Notter loam, moist, 1 to 8 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the upper part of Johns Valley and northwest of Bryce Canyon National Park. This soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown, mildly alkaline loam about 5 inches thick. The subsoil is brown, mildly alkaline gravelly clay loam about 9 inches thick. The upper 15 inches of the substratum is light gray, moderately alkaline gravelly sandy loam, and the lower part to a depth of 60 inches or more is gray, moderately alkaline very gravelly sand. A layer of lime accumulation is at a depth of about 14 inches.

Included in this unit are about 10 percent Bruman cobbly loam that is moist and has slopes of 10 to 30 percent and 5 percent Panguitch gravelly sandy loam that has slopes of 2 to 5 percent.

Permeability of this Notter soil is moderate. Available water capacity is 4 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Indian ricegrass, antelope bitterbrush, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is fair. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is the low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclass VIe, nonirrigated and irrigated. It is in Upland Gravelly Loam (Black Sagebrush) range site.

100—Notter loam, thick surface, 4 to 8 percent slopes. This very deep, well drained soil is on dissected alluvial fans and narrow valley plains in Panguitch Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex in shape and are medium in length. The vegetation in areas not cultivated is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown, mildly alkaline loam about 11 inches thick. The upper 12 inches of the subsoil is dark brown, mildly alkaline clay loam, and the lower 12 inches is brown, moderately alkaline clay loam. The substratum to a depth of 60 inches or more is light gray, strongly alkaline very gravelly loam. A layer of lime accumulation is at a depth of about 23 inches.

Included in this unit are about 10 percent Plite sandy loam and 5 percent Notter loam that has slopes of 1 to 4 percent.

Permeability of this Notter soil is moderate. Available water capacity is 7.5 to 9.0 inches. Water supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. It is also used as irrigated cropland.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are basin big sagebrush, needleandthread, Wyoming big sagebrush, Indian ricegrass, and blue grama. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to production of hay and small grain. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Basin Big Sagebrush) range site.

101—Notter gravelly coarse sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans in the Panguitch Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown gravelly coarse sandy loam about 3 inches thick. The upper 12 inches of the subsoil is brown gravelly sandy clay loam, and the lower 7 inches is brown gravelly loam. The upper 15 inches of the substratum is light gray very gravelly sandy loam, and the lower part to a depth of 60 inches or more is pale brown very gravelly sandy loam. A layer of lime accumulation is at a depth of about 22 inches.

Included in this unit are about 10 percent Andys very cobbly loam and 5 percent Tridell loam.

Permeability of this Notter soil is moderate. Available water capacity is 4.0 to 5.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage. Pinyon and Utah juniper have invaded some areas of this unit.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

102—Notter gravelly loam, 8 to 25 percent slopes. This very deep, well drained soil is on alluvial fans and mountainsides along the foothills near Panguitch and Antimony. This soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly Wyoming big sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown gravelly loam about 5 inches thick. The subsoil is brown gravelly clay loam about 9 inches thick. The upper 15 inches of the substratum is pinkish gray very gravelly sandy loam, and the lower part to a depth of 60 inches or more is gray very gravelly sand. A layer of lime accumulation is at a depth of about 14 inches.

Included in this unit are about 10 percent Bruman very cobbly loam that has slopes of 5 to 30 percent and 5 percent Tridell cobbly loam.

Permeability of this Notter soil is moderate. Available water capacity is 3.0 to 4.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by burning or spraying with chemicals.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

103—Notter very cobbly loam, 4 to 25 percent slopes. This very deep, well drained soil is on foothills and dissected alluvial fans in the Panguitch, Hatch, and Antimony areas. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown very cobbly loam about 3 inches thick. The subsoil is brown gravelly sandy clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly sandy loam. A layer of lime accumulation is at a depth of about 15 inches.

Included in this unit are about 10 percent Tridell cobbly loam and 5 percent Luhon very cobbly sandy loam.

Permeability of this Notter soil is moderate. Available water capacity is 4 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are low precipitation and low available water capacity. Undesirable plants can be controlled by burning or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

104—Notter Variant loam, 1 to 4 percent slopes. This very deep, well drained soil is on alluvial fans near Panguitch and in the lower part of Johns Valley, near Cottonwood and Deer Creeks. The soil formed in alluvium derived dominantly from intermediate and basic igneous rock. Slopes are linear and are medium in length. The present vegetation in most areas is mainly shrubs and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown, moderately alkaline loam about 8 inches thick. The upper 16 inches of the underlying material is grayish brown, moderately alkaline loam, and the lower part to a depth of 60 inches or more is grayish brown, moderately alkaline extremely cobbly sand.

Included in this unit are 5 percent Jodero loam that has slopes of 1 to 2 percent and 5 percent Notter loam.

Permeability of this Notter Variant soil is moderate. Available water capacity is 4.5 to 6.0 inches. Water supplying capacity is 4.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as irrigated cropland, rangeland, and wildlife habitat.

The potential plant community on this unit is 50 percent grasses, 5 percent forbs, and 45 percent shrubs. Important plants are Wyoming big sagebrush, black sagebrush, blue grama, needleandthread, and Indian ricegrass. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals.

If this unit is used for irrigated crops, the main limitation is low available water capacity.

Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIs, irrigated, and VIs, nonirrigated. It is in Semidesert Gravelly Loam (Black Sagebrush) range site.

105—Pahreah-Sheege complex, 1 to 20 percent slopes. This map unit is on mesas and ridges west of Paria View, in Bryce Canyon National Park. Slopes are medium in length. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,100 to 9,000 feet. The average annual precipitation is 18 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 75 days.

This unit is 50 percent Pahreah very gravelly loam, 1 to 20 percent slopes; 35 percent Sheege very gravelly sandy loam, 1 to 20 percent slopes; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Losee gravelly loam and 5 percent Rock outcrop.

The Pahreah soil is moderately deep and somewhat excessively drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface is covered with a mat of conifer needles and twigs. The surface layer is brown very gravelly loam about 0.5 inch thick. The subsoil is brown and grayish brown very gravelly loam 11 inches thick. The upper 14 inches of the substratum is pinkish white extremely gravelly loam, and the lower part to a depth of about 38 inches is pinkish white extremely cobbly loam. Limestone is at a depth of 38 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Pahreah soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 5 to 9 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Sheege soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface layer is brown very gravelly sandy loam about 8 inches thick. The next layer is dark grayish brown very cobbly loam about 8 inches thick. The substratum is white very cobbly silt loam about 3 inches thick. Limestone is at a depth of 19 inches. Depth to limestone ranges from 16 to 20 inches.

Permeability of the Sheege soil is moderate. Available water capacity is 1.5 to 3.0 inches. Water supplying capacity is 5 to 9 inches. Effective rooting depth is 16 to 20 inches. The organic matter content of the surface layer is about 2 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on the Pahreah soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The Pahreah soil has low potential for the production of commercial timber. The site index for ponderosa pine is 35 to 50; for Douglas fir, 40 to 50; and for white fir, 35 to 45.

The potential plant community on the Sheege soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The Sheege soil has moderate potential for the production of commercial timber. The site index for ponderosa pine and Douglas fir is 50 to 65, and for white fir it is 45 to 60.

The main concerns for producing and harvesting timber on this unit are seedling mortality, rock fragments on the surface, and plant competition.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees. Trees are subject to windthrow because of limited rooting depth.

If the timber is removed, the Pahreah soil produces 400 to 700 pounds of forage per acre and the Sheege soil produces 700 to 1,000 pounds.

Some moisture can be stored in the soils in this unit in winter for slow release in spring.

This map unit is in capability subclass VIIs, nonirrigated. The Pahreah soil is in High Mountain Stony Loam (Mixed Conifer) woodland site, and the Sheege soil is in High Mountain Shallow Loam (Mixed Conifer) woodland site.

106—Pahreah-Sielo complex, 2 to 25 percent slopes. This map unit is on benches and side slopes of mesas in Bryce Canyon National Park and on the southwestern part of the Paunsaugunt Plateau. Slopes are medium in length and typically face north and east. The present vegetation is mainly Douglas fir, ponderosa pine, white fir, and aspen. Elevation is 8,200 to 9,000 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 65 days.

This unit is 65 percent Pahreah very gravelly loam, 5 to 25 percent slopes, on side slopes of benches; 25 percent Sielo very fine sandy loam, 2 to 12 percent slopes, on convex tops of benches; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Swapps gravelly loam that has slopes of 5 to 25 percent. Also included are small areas of soils that are similar to the Pahreah soil but have a clay loam subsoil underlain by a very gravelly loam substratum.

The Pahreah soil is moderately deep and somewhat excessively drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface is covered with a mat of conifer needles and twigs. The surface layer is brown very gravelly loam about 0.5 inch thick. The subsoil is brown very gravelly loam about 11 inches thick. The upper 14 inches of the substratum is pinkish white extremely gravelly loam, and the lower part to a depth of about 38 inches is pinkish white extremely cobbly loam. Limestone is at a depth of 38 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Pahreah soil is moderate. Available water capacity is 2 to 4 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Sielo soil is very deep and well drained. It formed in residuum derived dominantly from limestone and shale. Typically, the surface is covered with a mat of partially decomposed to highly decomposed litter 2 inches thick. The surface layer is very pale brown very fine sandy loam about 9 inches thick. The subsoil is red, pink, and light red clay, silty clay loam, and silty clay 51 inches thick or more. Weathered shale is at a depth of 60 inches or more.

Permeability of the Sielo soil is very slow. Available water capacity is 9 to 11 inches. Water supplying capacity is 14 to 19 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Pahreah soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The Pahreah soil has low potential for the production of commercial timber. The site index for ponderosa pine is 35 to 50 percent; for Douglas fir, 40 to 50 percent; and for white fir, 30 to 45.

The main concerns for producing and harvesting timber are seedling mortality and rock fragments on the surface of the Pahreah soil and plant competition. Rock fragments in the upper 12 inches of the Pahreah soil may restrict the use of power augers when planting trees. Trees on the Pahreah soil are subject to windthrow because of the limited rooting depth.

The potential plant community on the Sielo soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 50 percent grasses, 20 percent forbs, and 30 percent shrubs. Important understory plants are dryland sedge, bearded wheatgrass, mountain snowberry, and Oregon grape.

The Sielo soil has high potential for the production of Douglas fir, white fir, and ponderosa pine and moderate potential for the production of aspen. The site index for Douglas fir and ponderosa pine is 65 to 80, and for white fir and aspen it is 60 to 70.

Conventional methods of harvesting timber generally are suited to this unit, but the soil may be compacted if heavy equipment is used when the soil is moist. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees.

If the timber is removed, the Pahreah soil can produce 400 to 700 pounds of forage per acre and the Sielo soil can produce 1,000 to 1,300 pounds per acre.

The Sielo soil can store moisture in winter for slow release in spring.

This map unit is in capability subclass VIIs, nonirrigated. The Pahreah soil is in High Mountain Stony Loam (Mixed Conifer) woodland site, and the Sielo soil is in High Mountain Loam (Mixed Conifer) woodland site.

107—Pahreah-Swapps complex, 25 to 65 percent slopes. This map unit is on north- and east-facing side slopes of mesas in the southern part of Paunsaugunt Plateau and in Bryce Canyon National Park. Slopes are concave to convex and are short. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,200 to 9,000 feet. The average annual precipitation is 18 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 75 days.

This unit is 45 percent Pahreah very gravelly loam, 25 to 65 percent slopes; 30 percent Swapps gravelly loam, 25 to 65 percent slopes, and 25 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent gravelly, fine textured soils at the base of the sides of mesas; 5 percent limestone Rock outcrop; 5 percent Losee very gravelly loam; and 5 percent loam.

The Pahreah soil is moderately deep and somewhat excessively drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface is covered with a mat of undecomposed and partially decomposed conifer needles and twigs 1 inch thick. The surface layer is brown very gravelly loam about 0.5 inch thick. The subsoil is brown very gravelly loam about 11 inches thick. The upper 14 inches of the substratum is pink and pinkish white extremely gravelly loam, and the lower part to a depth of 38 inches is pinkish white extremely cobbly loam. Limestone is at a depth of 38 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Pahreah soil is moderate. Available water capacity is 2 to 4 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Swapps soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from limestone and shale. Typically, the surface layer is brown gravelly loam about 3 inches thick. The subsoil is yellowish red gravelly loam about 5 inches thick. The upper 7 inches of the substratum is dark brown very gravelly loam, and the lower part to a depth of 23 inches is pink very gravelly loam. Limestone is at a depth of 23 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Swapps soil is moderate to bedrock. Available water capacity is 2 to 3 inches. Water supplying capacity is 8 to 12 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The Pahreah soil has low potential for the production of commercial timber. The site index for ponderosa pine is 35 to 50; for Douglas fir, 40 to 50; and for white fir, 30 to 45. Trees on this soil are subject to windthrow because of limited rooting depth.

The Swapps soil has moderate potential for the production of commercial timber. The site index for ponderosa pine and Douglas fir is 50 to 65, and for white fir it is 45 to 60.

The main concerns for producing and harvesting timber on this unit are steepness of slope, seedling mortality, rock fragments on the surface, and plant competition.

Conventional methods of harvesting timber can be used in areas of this unit that have slopes of less than 45 percent and in steeper areas where slopes are 200 feet long or less. In areas where slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, the Pahreah soil can produce 400 to 700 pounds of forage per acre and the Swapps soil can produce 700 to 1,000 pounds per acre.

The soils in this unit can be used to store moisture in winter for slow release in spring.

This map unit is in capability subclass VIIs, nonirrigated. It is in High Mountain Stony Loam (Mixed Conifer) woodland site.

108—Panguitch-Mitch association, 0 to 5 percent slopes. This map unit is on dissected alluvial fans between Prospect Creek and Rock Creek. Slopes are convex and long. The present vegetation is mainly basin big sagebrush. Elevation is 7,000 to 7,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 60 percent Panguitch gravelly sandy loam, 2 to 5 percent slopes, on alluvial fans; 25 percent Mitch silt loam, 0 to 3 percent slopes, along intermittent stream channels; and 15 percent other soils.

Included in this unit are about 5 percent soils that are shallow to moderately deep to a lime-cemented hardpan and that support black sagebrush, 5 percent Brycan very fine sandy loam that has slopes of 1 to 6 percent, and 5 percent Guben gravelly loam.

The Panguitch soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown and brown gravelly sandy loam about 5 inches thick. The upper 6 inches of the subsoil is brown gravelly clay loam, and the lower 15 inches is brown gravelly sandy loam. The upper 21 inches of the substratum is pink and pinkish white gravelly sandy loam, and the lower part to a depth of 60 inches or more is pale brown and pinkish white very gravelly loamy sand.

Permeability of the Panguitch soil is moderate. Available water capacity is 4 to 5 inches. Water supplying capacity is 5 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Mitch soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown silt loam over dark grayish brown loam about 4 inches thick. The substratum to a depth of 60 inches or more is stratified, dark grayish brown to light brownish gray silt loam to very fine sandy loam.

Permeability of the Mitch soil is moderate. Available water capacity is 10 to 11 inches. Water supplying capacity is 6 to 9 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is subject to rare periods of flooding.

This unit is used mainly as rangeland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on the Panguitch soil is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat. The suitability of the Panguitch soil for rangeland seeding is fair. The main limitation is the gravelly surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

The potential plant community on the Mitch soil is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important understory plants are basin wildrye, western wheatgrass, Nevada bluegrass, and basin big sagebrush. The suitability of the Mitch soil for rangeland seeding is good. Undesirable plants can be controlled by plowing, chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is used as winter range for deer. Reseeding should include browse species such as bitterbrush and curlleaf mountainmahogany.

The Panguitch soil is in capability subclass VIe, nonirrigated, and the Mitch soil is in capability subclass VIc, nonirrigated. The Panguitch soil is in Upland Loam range site, and the Mitch soil is in Loamy Bottom range site.

109—Panguitch-Riverwash association, 5 to 15 percent slopes. This map unit is on dissected alluvial fans and in drainageways at the base of the west slopes of the Sevier Plateau, between Lime Kiln Canyon and Horse Valley Creek. Slopes are convex and are medium in length. The present vegetation is mainly pinyon and juniper. Elevation is 7,000 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 80 to 90 days.

This unit is 65 percent Panguitch gravelly loam, 5 to 15 percent slopes, on alluvial fans; 25 percent Riverwash in drainageways; and 10 percent other soils.

Included in this unit is about 10 percent soils that are similar to this Panguitch soil but are on the upper part of fans and have a very cobbly or extremely cobbly subsoil.

The Panguitch soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown and brown gravelly loam about 5 inches thick. The upper 6 inches of the subsoil is brown gravelly clay loam, and the lower 15 inches is brown gravelly sandy loam. The upper 2l inches of the substratum is pink and pinkish white gravelly sandy loam, and the lower part to a depth of 60 inches or more is pale brown and pinkish white very gravelly loamy sand.

Permeability of the Panguitch soil is moderate. Available water capacity is 4 to 5 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

Riverwash consists of deep, unconsolidated, stratified, gravelly and cobbly volcanic alluvium recently deposited by streams. It is subject to flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as rangeland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on the Panguitch soil is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat. The suitability of the unit for rangeland seeding is fair. The main limitation is the gravelly surface layer. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

Riverwash is not suited to most management practices because it is gravelly and cobbly and is subject to frequent changes in streamflow. It has potential for use as roadfill or as a source of gravel.

This map unit is used as range for deer in winter. Reseeding should include browse species such as bitterbrush and curlleaf mountainmahogany.

The Panguitch soil is in capability subclass VIe, nonirrigated. It is in Upland Loam range site. Riverwash is in capability subclass VIII. It is not placed in a range site.

110—Paunsaugunt gravelly loam, 2 to 15 percent slopes. This shallow, well drained soil is on mesas and low hills on the Paunsaugunt Plateau, in the central part of the survey area. The soil formed in residuum derived dominantly from limestone. Slopes are convex to concave and are medium in length. The present vegetation is mainly ponderosa pine. Elevation is 7,600 to 8,400 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 50 to 75 days.

Typically, the surface layer is brown gravelly loam about 3 inches thick. The next layer is grayish brown very cobbly sandy loam 5 inches thick. The substratum is light brownish gray very cobbly sandy loam 7 inches thick. Limestone is at a depth of 15 inches. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit are about 5 percent Vanet gravelly loam on north-facing colluvial sides of mesas, 5 percent deep loamy soils on east-facing colluvial side slopes, and 5 percent limestone Rock outcrop along the edges of mesas. Also included are small areas of shallow gravelly soils that have slopes of as much as 50 percent and that are in Bryce Canyon National Park, between the canyon rim and the west park boundary.

Permeability of the Paunsaugunt soil is moderately rapid to bedrock. Available water capacity is 1 to 2 inches. Water supplying capacity is 3 to 8 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is moderately rapid, and the hazard of water erosion is severe.

This unit is used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of ponderosa pine with an understory of 25 percent grasses, 15 percent forbs, and 60 percent shrubs. Important understory plants are Indian ricegrass, muttongrass, sedge, greenleaf manzanita, Utah serviceberry, and Gambel oak.

The Paunsaugunt soil has low potential for the production of ponderosa pine. The site index for ponderosa pine is 35 to 50.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. The main concerns for producing and harvesting timber are the shallow depth and droughtiness of the soil, low available water capacity, low rainfall, and seedling mortality. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Trees are subject to windthrow because of limited rooting depth. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees. Specialized methods of planting such as use of seedlings in containers or shade blocks may be needed to ensure successful regeneration.

If the timber is removed, the Paunsaugunt soil can produce 400 to 700 pounds of forage per acre.

This map unit is in capability subclass VIIs, nonirrigated. The Paunsaugunt soil is in Mountain Shallow Loam (Ponderosa Pine) woodland site.

111—Paunsaugunt-Syrett gravelly loams, 2 to 20 percent slopes. This map unit is on mesas and benches on the Paunsaugunt Plateau, north of East and Blue Fly Creeks. Slopes are medium in length. The present vegetation is mainly ponderosa pine. Elevation is 7,600 to 8,400 feet. The average annual precipitation is 16 to 22 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 90 days.

This unit is 55 percent Paunsaugunt gravelly loam, 2 to 20 percent slopes, on tops of mesas and benches; 30 percent Syrett gravelly loam, 2 to 12 percent slopes, on colluvial toe slopes; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent shallow gravelly soils that have a light-colored surface layer and 5 percent limestone Rock outcrop.

The Paunsaugunt soil is shallow and well drained. It formed in residuum derived dominantly from limestone. Typically, the surface layer is brown gravelly loam about 3 inches thick. The next layer is grayish brown very cobbly sandy loam 5 inches thick. The substratum is light brownish gray very cobbly sandy loam 7 inches thick. Limestone is at a depth of 15 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Paunsaugunt soil is moderately rapid to bedrock. Available water capacity is 1 to 2 inches. Water supplying capacity is 2 to 6 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Syrett soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface layer is brown gravelly loam about 1 inch thick. The next layer is brown very gravelly loam 11 inches thick. The upper 11 inches of the substratum is brown very gravelly loam, and the lower part to a depth of 38 inches is reddish yellow very gravelly silt loam. Limestone is at a depth of 38 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Syrett soil is moderate to bedrock. Available water capacity is 2 to 4 inches. Water supplying capacity is 5 to 9 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation.

The potential plant community on the Paunsaugunt soil is an overstory of ponderosa pine and an understory of 25 percent grasses, 15 percent forbs, and 60 percent shrubs. Important understory plants are muttongrass, sedge, greenleaf manzanita, Utah serviceberry, and Gambel oak.

The potential plant community on the Syrett soil is an overstory of ponderosa pine and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are Indian ricegrass, muttongrass, black sagebrush, greenleaf manzanita, and blue grama.

The Paunsaugunt soil has low potential for the production of ponderosa pine. The site index for ponderosa pine is 35 to 50.

The Syrett soil has moderate potential for the production of ponderosa pine. The site index for ponderosa pine is 50 to 65.

Conventional methods of harvesting timber on this unit generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. The main concerns for producing and harvesting timber are seedling mortality and the hazard of windthrow on the Paunsaugunt soil. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees. Specialized methods of planting such as use of seedlings in containers or shade blocks may be needed to ensure successful regeneration. Trees are subject to windthrow because of limited rooting depth.

If the timber is removed, the soils in this unit can produce 400 to 700 pounds of forage per acre.

This map unit is in capability subclass VIIs, nonirrigated. The Paunsaugunt soil is in Mountain Shallow Loam (Ponderosa Pine) woodland site, and the Syrett soil is in Mountain Gravelly Loam (Ponderosa Pine) woodland site.

112—Playas. This map unit is on nearly level flood plains near the East Fork of the Sevier River, in Johns Valley. It consists of white silt loam that is strongly alkaline to very strongly alkaline. It produces little if any vegetation.

This map unit is in capability subclass VIIIs. It is not placed in a range or woodland site.

113—Plite sandy loam, 2 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial valley bottoms in Panguitch and Johns Valleys. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are linear and long. The present vegetation in most areas is mainly basin big sagebrush and grasses. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 9 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown, mildly alkaline sandy loam about 33 inches thick. The underlying material to a depth of 60 inches or more is pale brown, moderately alkaline sandy loam.

Included in this unit are about 10 percent Comodore extremely cobbly clay loam and 5 percent Tridell cobbly loam. Also included are small areas of Notter gravelly coarse sandy loam.

Permeability of the Plite soil is moderately rapid. Available water capacity is 6 to 7 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community is 65 percent grasses, 10 percent forbs, and 25 percent shrubs. Important plants are basin big sagebrush, basin wildrye, and western wheatgrass. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitations are slope and the low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. If furrow irrigation is used, water should be applied at frequent intervals and runs should be short. In some areas the supply of irrigation water is inadequate after mid-season.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Loamy Bottom range site.

114—Podo loamy sand, 1 to 12 percent slopes. This shallow, somewhat excessively drained soil is on structural benches adjacent to the intermittent streams on Johnson Bench. The soil formed in alluvium and residuum derived dominantly from sandstone, limestone, and shale. Slopes are convex to concave and are short. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown loamy sand about 6 inches thick. The underlying material, to a depth of 19 inches, is light yellowish brown gravelly sandy loam. Sandstone is at a depth of 19 inches. Depth to sandstone ranges from 10 to 20 inches.

Included in this unit are about 10 percent Neto fine sandy loam on toe slopes of benches and 5 percent Brycan very fine sandy loam that has slopes of 1 to 6 percent and is on narrow bottoms adjacent to stream channels.

Permeability of this Podo soil is moderately rapid. Available water capacity is 1 to 2 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are mountain big sagebrush, Indian ricegrass, black sagebrush, and antelope bitterbrush. The suitability of the unit for rangeland seeding is poor. The main limitation is the shallow depth of the soil. Undesirable plants can be controlled by burning or spraying with chemicals.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Loam range site.

115—Podo-Wiggler complex, 10 to 50 percent slopes. This map unit is on mountainsides in the Mammoth and Asay Creek areas. Slopes are convex and are medium in length. The present vegetation in most areas is mainly ponderosa pine, Rocky Mountain juniper, shrubs, and grasses. Elevation is 7,600 to 8,500 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 44 degrees F, and the freeze-free period is 60 to 85 days.

This unit is 55 percent Podo very gravelly loam, 10 to 50 percent slopes; 30 percent Wiggler channery clay loam, 25 to 50 percent slopes; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Guben gravelly loam and 5 percent Rock outcrop. Also included are Podo soils that have slopes of 5 to 10 percent.

The Podo soil is shallow and somewhat excessively drained. It formed in residuum and alluvium derived dominantly from sandstone. Typically, the surface layer is reddish yellow very gravelly loam about 2 inches thick. The next layer is reddish yellow gravelly loam 3 inches thick. The underlying material to a depth of 13 inches is light brown gravelly loam. Sandstone is at a depth of 13 inches. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is 1 inch to 2 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Wiggler soil is shallow and well drained. It formed in residuum derived dominantly from shale. Typically, the surface layer is gray channery loam about 4 inches thick. The underlying material to a depth of 18 inches is light gray loam. Shale is at a depth of 18 inches. Depth to shale ranges from 8 to 20 inches.

Permeability of the Wiggler soil is moderate. Available water capacity is 2.5 to 3.0 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Wiggler and Podo soils is an overstory of ponderosa pine and an understory of 25 percent grasses, 10 percent forbs, and 50 percent shrubs. Important understory plants are Indian ricegrass, muttongrass, sedge, greenleaf manzanita, and Utah serviceberry. The site index of the unit for ponderosa pine is 40. Because the site index is so low, management of the unit is limited to rangeland. The suitability of the unit for rangeland seeding is very poor. The main limitations are depth to bedrock and the low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. The Podo and Wiggler soils are in Mountain Shallow Loam (Ponderosa Pine) woodland site.

116—Podo-Rock outcrop complex, 10 to 40 percent slopes. This map unit is on mountainsides and hillsides east and northeast of Henrieville. Slopes are concave to convex and are short. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 70 percent Podo channery sandy loam, 10 to 40 percent slopes; 15 percent Rock outcrop; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Ruko clay loam and 5 percent soils that are similar to the Podo soil but are 20 to 40 inches deep to sandstone.

The Podo soil is shallow and somewhat excessively drained. It formed in residuum and alluvium derived dominantly from sandstone. Typically, the surface layer is pale brown channery sandy loam about 4 inches thick. The upper 8 inches of the underlying material is brown gravelly sandy loam, and the lower part to a depth of 16 inches is grayish brown gravelly sandy loam. Sandstone is at a depth of 16 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is 1 to 2 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community on the Podo soil is an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important understory plants are bluebunch wheatgrass, Indian ricegrass, mountain big sagebrush, and black sagebrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are depth to sandstone and the low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. The Podo soil is in Upland Shallow Loam (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a woodland or range site.

117—Quilt very cobbly loam, 4 to 25 percent slopes. This very deep, well drained soil is on mountainsides in Panguitch Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown very cobbly loam about 4 inches thick. The upper 15 inches of the subsoil is brown cobbly clay, and the lower 24 inches is brown cobbly clay loam. The upper 5 inches of the substratum is grayish brown gravelly sandy clay loam, and the lower part to a depth of 60 inches or more is pinkish gray gravelly coarse sandy loam.

Included in this unit are about 10 percent Harol very cobbly loam that has slopes of 15 to 40 percent and 5 percent Zillion very cobbly loam.

Permeability of the Quilt soil is slow. Available water capacity is 7 to 9 inches. Water supplying capacity is 7.5 to 10.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, Indian ricegrass, mountain big sagebrush, and western wheatgrass. The suitability of the unit for rangeland seeding is fair. The main limitations are rock fragments in the surface layer and slope. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Upland Clay range site.

118—Quilt very cobbly loam, 25 to 40 percent slopes. This very deep, well drained soil is on low hills and dissected alluvial fans west and north of Hatch, in the Mammoth and Asay Creeks area, near Coal Pit Wash, and west of Johns Valley. The soil formed in alluvium derived dominantly from intermediate igneous rock. Slopes are convex to concave and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days

Typically, the surface layer is brown very cobbly loam about 5 inches thick. The upper 10 inches of the subsoil is dark brown gravelly clay loam, and the lower 27 inches is light brown gravelly clay loam. The substratum to a depth of 60 inches or more is pink gravelly coarse sandy loam.

Included in this unit are about 10 percent Harol very cobbly loam that has slopes of 15 to 40 percent and 5 percent Widtsoe gravelly sandy loam.

Permeability of this Quilt soil is slow. Available water capacity is 7.0 to 8.5 inches. Water supplying capacity is 7.5 to 10.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, mountain big sagebrush, blue grama, and Indian ricegrass. The suitability of the unit for rangeland seeding is poor. The main limitations are rock fragments in the surface layer and slope. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This map unit is in capability subclass VIs, nonirrigated. It is in Upland Clay range site.

119—Redcreek gravelly sandy loam, dry, 10 to 40 percent slopes. This shallow, well drained soil is on ridgetops and fan terraces southwest and northeast of Antimony. The soil formed in residuum derived dominantly from mixed sedimentary and igneous rock. Slopes are convex and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown gravelly sandy loam about 8 inches thick. The underlying material to a depth of 19 inches is light brownish gray gravelly sandy loam. Igneous bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit are 10 percent Tolman very cobbly loam and Redcreek cobbly loam. Also included are Redcreek soils that have slopes of less than 10 percent or more than 40 percent.

Permeability of the Redcreek soil is moderately rapid. Available water capacity is 1 inch to 2 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, needleandthread, Mormon tea, and blue grama. The suitability of the unit for rangeland seeding is very poor. The main limitations are the depth to bedrock and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. It is in Semidesert Shallow Loam range site.

120—Redcreek cobbly loam, 15 to 50 percent slopes. This shallow, well drained soil is on mountainsides in the vicinity of Hatch. The soil formed in residuum derived dominantly from mixed sedimentary and igneous rock. Slopes are convex and are medium in length. The present vegetation in most areas is mainly pinyon, juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown cobbly loam about 8 inches thick. The underlying material to a depth of 19 inches is light brownish gray gravelly sandy loam. Sandstone is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches. Some small areas have more than 18 percent clay in the underlying material.

Included in this unit are about 10 percent Wiggler channery loam and 5 percent Bruman very cobbly loam.

Permeability of the Redcreek soil is moderately rapid. Available water capacity is 1 inch to 2 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important understory plants are Indian ricegrass, blue grama, mountain big sagebrush, bluebunch wheatgrass, and black sagebrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are the depth to bedrock and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Loam (Pinyon-Juniper) woodland site.

121—Riverwash. This map unit is in the Tropic-Henrieville area, along the Paria River and along parts of Henderson and Henrieville Creeks. Riverwash consists of unstabilized sandy, silty, or gravelly sediment that is flooded and reworked by streams so often that it produces only very sparse vegetation.

This unit has little value except as wildlife habitat.

This map unit is in capability subclass VIII. It is not placed in a range or woodland site.

122—Rock outcrop. This map unit is throughout much of the survey area. It occurs as escarpments along mesas, benches, and canyon walls. It consists of 90 percent or more exposed basalt, limestone, and sandstone. Slopes are steep to very steep or are nearly vertical.

Included in this unit are small areas of Redcreek cobbly loam, Tolman very cobbly silt loam, and Badland.

This unit supports little if any vegetation. The vegetation, where present, consists of juniper, pinyon, bitterbrush, birchleaf mountainmahogany, yucca, Indian ricegrass, galleta, and associated forbs.

This map unit is in capability class VIII. It is not placed in a range or woodland site.

123—Rock outcrop-Podo complex, 40 to 70 percent slopes. This map unit is on mountainsides northeast of Tropic and east of Henrieville. Slopes are convex to concave and are medium in length. The present vegetation in most areas is mainly very sparse pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,900 to 7,900 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 90 days.

This unit is 60 percent Rock outcrop; 25 percent Podo channery sandy loam, 40 to 70 percent slopes; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Ruko clay loam and 5 percent soils that are similar to the Podo soil but are 20 to 40 inches deep to sandstone.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

The Podo soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is pale brown channery sandy loam about 4 inches thick. The upper 8 inches of the underlying material is brown gravelly sandy loam, and the lower part to a depth of 16 inches is brown gravelly sandy loam. Sandstone is at a depth of 16 inches. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is 1 inch to 2 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit has limited use as wildlife habitat.

The potential plant community on the Podo soil is an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important understory plants are Indian ricegrass, blue grama, mountain big sagebrush, bluebunch wheatgrass, and black sagebrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are the depth to bedrock and low available water capacity.

This map unit is in capability class VIII. The Podo soil is in Upland Shallow Loam (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a range or woodland site.

124—Rubble land. This map unit is on steep mountainsides. It consists of large areas of talus produced from rimrock of lava flow material. The less sloping areas are very stony and extremely stony and have included areas of shallow soils. This unit supports a sparse cover of pinyon, juniper, Indian ricegrass, and needleandthread.

This map unit is capability class VIII, nonirrigated. It is not placed in a range or woodland site.

125—Ruko clay loam, 30 to 60 percent slopes. This shallow, well drained soil is on mountainsides in the Sheep Creek area and east of Henrieville. The soil formed in residuum derived dominantly from shale. Slopes are convex to concave and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is light gray clay loam about 4 inches thick. The underlying material to a depth of 15 inches is light grayish brown clay. Shale is at a depth of 15 inches. Depth to shale ranges from 10 to 20 inches.

Included in this unit are about 10 percent Dimyaw Family soils and 5 percent Podo channery sandy loam that has slopes of 10 to 40 percent.

Permeability of the Ruko soil is very slow. Available water capacity is 2 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are birchleaf mountainmahogany, Utah serviceberry, Fremont mahonia, Indian ricegrass, and Nevada bluegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are depth to shale and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Clay (Pinyon-Juniper) woodland site.

126—Ruko-Podo complex, 15 to 60 percent slopes. This map unit is on mountainsides north of Tropic and east of Henrieville. Slopes are convex to concave and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 60 percent Ruko clay loam, 30 to 60 percent slopes, eroded; 30 percent Podo gravelly sandy loam, 15 to 40 percent slopes, eroded; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Rock outcrop and 5 percent Dimyaw Family soils.

The Ruko soil is shallow and well drained. It formed in residuum derived dominantly from shale. Typically, the surface layer is pale brown clay loam about 4 inches thick. The underlying material to a depth of 19 inches is light gray clay. Shale is at a depth of 19 inches. Depth to shale ranges from 10 to 20 inches.

Permeability of the Ruko soil is very slow. Available water capacity is 2 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. Organic matter content of the surface layer is 1 to 2 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Podo soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is brown gravelly sandy loam about 6 inches thick. The upper 6 inches of the underlying material is light yellowish brown gravelly sandy loam, and the lower part to a depth of 19 inches is light yellowish brown cobbly sandy loam. Sandstone is at a depth of 19 inches. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is 1.5 to 2.5 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community on the Ruko soil is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important plants are birchleaf mountainmahogany, Utah serviceberry, Fremont mahonia, and Indian ricegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the depth to shale and low available water capacity.

The potential plant community on the Podo soil is an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important plants are mountain big sagebrush, Indian ricegrass, bluebunch wheatgrass, antelope bitterbrush, blue grama, and black sagebrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are the depth to shale and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. The Ruko soil is in Upland Shallow Clay (Pinyon-Juniper) woodland site, and the Podo soil is in Upland Shallow Loam (Pinyon-Juniper) woodland site.

127—Schauson loam, 2 to 4 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains in the higher valleys throughout the survey area. It formed in alluvium derived dominantly from igneous rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly mountain big sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown, neutral loam about 5 inches thick. The subsoil is dark brown and brown, neutral sandy clay loam 20 inches thick. The substratum is yellowish brown, mildly alkaline sandy clay loam 20 inches thick. Below this is a buried subsoil of yellowish brown, mildly alkaline clay loam 15 inches thick.

Included in this unit are about 5 percent soils that are similar to this Schauson soil but have some secondary lime accumulation below a depth of 40 inches; 5 percent Quilt very cobbly loam that has slopes of 4 to 25 percent; and 5 percent Harol very cobbly loam that has slopes of 8 to 15 percent.

Permeability of this Schauson soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 8 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland and wildlife habitat. It is also used for irrigated crops.

The potential plant community is 60 percent grasses, 10 percent forbs and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. In some areas the supply of irrigation water is inadequate after midseason. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Upland Loam range site.

128—Schauson loam, 4 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains in Dog Valley; near Asay Creek and Coal Pit Wash, north of Hatch; and southwest of Panguitch. The soil formed in alluvium derived dominantly from igneous rock. Slopes are slightly undulating and long. The present vegetation in most areas is mainly mountain big sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown loam about 5 inches thick. The subsoil is dark brown and brown sandy clay loam 20 inches thick. The substratum is yellowish brown sandy clay loam 20 inches thick. Below this is a buried subsoil of yellowish brown clay loam 15 inches thick.

Included in this unit are about 5 percent soils that are similar to this Schauson soil but have some secondary lime accumulation below a depth of 40 inches and 5 percent Quilt very cobbly loam that has slopes of 4 to 25 percent. Also included are small areas of Harol very cobbly loam that has slopes of 2 to 15 percent and Fughes silty clay loam.

Permeability of this Schauson soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 8 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat. The suitability of the unit for rangeland seeding is fair. The main limitation is steepness of slope in some areas. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam range site.

129—Sevier-Skutum association, 5 to 35 percent slopes. This map unit is on benches along the breaks of the Paunsaugunt Plateau, between Big Hollow and Kanab Creek, and along the East Fork Sevier River and its tributaries. Slopes are convex to concave and are medium in length. The present vegetation is mainly big sagebrush on the Sevier soil and quaking aspen on the Skutum soil. Elevation is 7,900 to 8,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 36 to 42 degrees F, and the average freeze-free period is 60 to 70 days.

This unit is 50 percent Sevier very fine sandy loam, 5 to 25 percent slopes; 35 percent Skutum fine sandy loam, 10 to 35 percent slopes; and 15 percent other soils and Rock outcrop.

Included in this unit are about 5 percent Rock outcrop consisting of sandstone and shale, 5 percent very shallow soils, and 5 percent poorly drained, fine textured soils in seep areas on the lower part of benches.

The Sevier soil is moderately deep and moderately well drained. It formed in residuum and colluvium derived dominantly from shale and sandstone. Typically, the surface layer is brown very fine sandy loam about 4 inches thick. The next layer is brown clay loam 5 inches thick. The subsoil is pale brown clay loam 6 inches thick. The substratum is light gray silty clay about 9 inches thick. Weathered shale is at a depth of 24 inches. Depth to shale ranges from 20 to 40 inches.

Permeability of the Sevier soil is very slow. Available water capacity is 3 to 5 inches. Water supply capacity is 7 to 12 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 2 to 4 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Skutum soil is deep and moderately well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface is covered with a mat of aspen litter, duff, and twigs 1 inch thick. The surface layer is dark brown fine sandy loam about 6 inches thick. The next layer is brown fine sandy loam and loam 11 inches thick. The upper 7 inches of the subsoil is brown gravelly clay loam, and the lower 12 inches is brown and very dark gray gravelly clay. The substratum is brownish yellow gravelly sandy loam 14 inches thick. Fractured shale is at a depth of 50 inches. Depth to bedrock ranges from 50 to 60 inches.

Permeability of the Skutum soil is slow. Available water capacity is 5 to 6 inches. Water supplying capacity is 9 to 12 inches. Effective rooting depth is 50 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Sevier soil is 65 percent grasses, 20 percent forbs, and 15 percent shrubs. Important understory plants are bluebunch wheatgrass, mountain brome, and mountain big sagebrush. If the overstory is removed, the potential average annual production of air-dry vegetation ranges from 700 to 1,000 pounds per acre. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the instability of the soil, the hazard of erosion, and the low available water capacity. Areas where brush is managed by prescribed burning or by chemical or mechanical methods may be subject to a higher risk of erosion. Where mechanical treatment is used it should be done on the contour. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals.

The Sevier soil is subject to slumping. Deep road cuts should be avoided in road construction to minimize slumping.

The potential plant community on the Skutum soil is an overstory of aspen and an understory of 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Important understory plants are bearded wheatgrass, mountain brome, bluegrass, and mountain snowberry.

The Skutum soil has high potential for the production of aspen. The site index for aspen is 70 to 85. Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

If the timber is removed, the Skutum soil can produce 1,000 to 1,600 pounds of forage per acre.

This map unit is in capability subclass VIe, nonirrigated. The Sevier soil is in Mountain Loam range site, and the Skutum soil is in High Mountain Loam (Aspen) woodland site.

130—Sheege-Swapps complex, 30 to 50 percent slopes. This map unit is on the sides of mesas. It is in long narrow bands adjacent to the upper tributaries of the East Fork Sevier River, on the southern part of the Paunsaugunt Plateau. Slopes are complex and short. The present vegetation is Douglas fir, ponderosa pine, and white fir. Elevation is 8,800 to 9,600 feet. The average annual precipitation is 22 to 27 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 70 days.

This unit is 55 percent Sheege gravelly sandy loam, 30 to 50 percent slopes; 25 percent Swapps gravelly loam, 30 to 50 percent slopes; and 20 percent other components. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent limestone Rock outcrop along the crest of the sides of mesas, 5 percent Pahreah very gravelly loam, 5 percent Hatch loam, and 5 percent Sielo very fine sandy loam along the toe of the sides of mesas.

The Sheege soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from limestone. Typically, the surface layer is brown gravelly sandy loam about 2 inches thick. The next layer is grayish brown and dark grayish brown very cobbly loam 14 inches thick. The substratum is white very cobbly silt loam 3 inches thick over limestone. Limestone is at a depth of 19 inches. Depth to limestone ranges from 16 to 20 inches.

Permeability of the Sheege soil is moderate to bedrock. Available water capacity is 1 to 3 inches. Water supplying capacity is 6 to 9 inches. Effective rooting depth is 16 to 20 inches. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Swapps soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from limestone and shale. Typically, the surface is covered with a mat of undecomposed to partially decomposed conifer needles and twigs 1 inch thick. The surface layer is brown gravelly loam about 3 inches thick. The subsoil is yellowish red gravelly loam 5 inches thick. The upper 7 inches of the substratum is dark brown very gravelly loam, and the lower part to a depth of 23 inches is pink very gravelly loam. Limestone is at a depth of 23 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Swapps soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 9 to 12 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as woodland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Sheege soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The potential plant community on the Swapps soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The Sheege soil has low potential for the production of ponderosa pine and Douglas fir and moderate potential for white fir. The site index for ponderosa pine is 35 to 50; for Douglas fir, 40 to 50; and for white fir, 45 to 60.

The Swapps soil has moderate potential for the production of ponderosa pine, Douglas fir, and white fir. The site index for ponderosa pine and Douglas fir is 50 to 65, and for white fir it is 45 to 60.

The main concerns for producing and harvesting timber on this unit are steepness of slope, seedling mortality, rock fragments on the surface, and plant competition. Conventional methods of harvesting timber can be used in areas that have slopes of less than 45 percent and in steeper areas where slopes are 200 feet long or less. In areas where slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Trees on the Sheege soil are subject to windthrow because of the limited rooting depth. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, the soils in this unit can produce 700 to 1,000 pounds of forage per acre.

This map unit is in capability subclass VIIs, nonirrigated. The Sheege soil is in High Mountain Shallow Loam (Mixed Conifer) woodland site, and the Swapps soil is in High Mountain Stony Loam (Mixed Conifer) woodland site.

131—Showalter-Guben complex, dry, 0 to 8 percent slopes. This map unit is on pediments north of State Highway 12, in the vicinity of Berry Spring, Mud Spring, Spring Creek, and Showalter Creek. Slopes are convex to concave and are medium to long. The present vegetation is mainly black sagebrush. Elevation is 7,400 to 8,100 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 80 days.

This unit is 40 percent Showalter cobbly loam, dry, 0 to 2 percent slopes; 35 percent Guben gravelly loam, dry, 2 to 8 percent slopes, in convex areas; and 25 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 25 percent Showalter cobbly loam in concave depressional areas.

The Showalter soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is dark brown cobbly loam about 10 inches thick. The upper 7 inches of the subsoil is brown very gravelly clay loam, and the lower 13 inches is yellowish red very gravelly clay and very gravelly clay loam. The next layer is light yellowish brown extremely gravelly sandy clay loam 6 inches thick. The substratum is pinkish white and brown gravelly loam to a depth of 60 inches or more. A layer of lime accumulation is between depths of 30 and 48 inches.

Permeability of the Showalter soil is slow. Available water capacity is 4.5 to 6.0 inches. Water supplying capacity is 7 to 9 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Guben soil is very deep and well drained. It formed in mixed alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown and brown gravelly loam about 10 inches thick. The subsoil is brown very gravelly sandy clay loam 4 inches thick. The substratum to a depth of 60 inches or more is light gray extremely gravelly sandy clay loam, very gravelly loam, and extremely gravelly sandy loam. A layer of lime accumulation is between depths of 14 and 44 inches.

Permeability of the Guben soil is moderate. Available water capacity is 4 to 9 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It is also used for wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important plants are Indian ricegrass, needleandthread, antelope bitterbrush, and black sagebrush.

Areas of this unit that are in the higher rainfall areas and that have a high productivity potential generally are suitable for forage improvement practices such as removing shrubs and reseeding. Areas of the unit that are in the lower rainfall areas and that have a low productivity potential generally are not suitable.

This unit is used as colonies for prairie dogs and as summer range for antelope.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Black Sagebrush) range site.

132—Shupert silty clay loam, wet, 0 to 1 percent slopes. This very deep, somewhat poorly drained soil is on low lying alluvial fans and valley plains in Panguitch Valley. The soil formed in alluvium derived dominantly from mixed alluvium. Slopes are linear and long. Elevation is 6,500 to 7,300 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is light brownish gray silty clay loam about 10 inches thick. The upper 24 inches of the underlying material is light gray silty clay loam, the next 8 inches is very pale brown clay loam, and the lower part to a depth of 60 inches or more is light gray loam. A few distinct, reddish brown mottles are below a depth of 40 inches.

Included in this unit are about 10 percent Villy Family soils and 5 percent Jodero loam.

Permeability of the Shupert soil is moderately slow. Available water capacity is 10 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. A seasonal high water table fluctuates between depths of 40 and 60 inches in most years. This soil is subject to rare periods of flooding.

This unit is used for irrigated crops, pasture, and wildlife habitat.

The main crops grown on this unit are clover, grass, small grain, and native pasture. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit. Water should be applied in amounts large enough to wet the root zone but small enough to minimize the leaching of plant nutrients. Irrigation water needs to be applied carefully to prevent the buildup of a high water table. Drainage may also be needed.

This map unit is in capability subclass IIIw, irrigated. It is not placed in range or woodland site.

133—Sielo very fine sandy loam, 2 to 12 percent slopes. This very deep, well drained soil is on mesa tops and benches on the sides of mesas in the upper part of the East Fork Sevier River drainage system, on the south end of the Paunsaugunt Plateau. The soil formed in residuum derived dominantly from limestone and shale. Slopes are medium in length. The present native vegetation is mainly Douglas fir, ponderosa pine, white fir, and aspen. Elevation is 8,400 to 9,000 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 60 to 65 days.

Typically, the surface is covered with a mat of partially decomposed to highly decomposed litter 2 inches thick. The surface layer is very pale brown very fine sandy loam about 9 inches thick. The subsoil is red, light red, and pink clay, silty clay loam, and silty clay 51 inches thick or more. Weathered shale is at a depth of 60 inches or more.

Included in this unit are about 15 percent Hatch loam on the upper part of benches and 10 percent Pahreah very gravelly loam and Swapps gravelly loam that have slopes of 5 to 25 percent and are on mesas and benches.

Permeability of this Sielo soil is very slow. Available water capacity is 9 to 11 inches. Water supplying capacity is 14 to 19 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 50 percent grasses, 20 percent forbs, and 30 percent shrubs. Important understory plants are dryland sedge, bearded wheatgrass, mountain snowberry, and Oregon grape.

The Sielo soil has high potential for the production of Douglas fir, white fir, and ponderosa pine and moderate potential for the production of aspen. The site index for

Douglas fir and ponderosa pine is 65 to 80, and for white fir and aspen it is 60 to 70.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Machine planting of conifer seedlings is a suitable method of regenerating a stand on this unit.

If the timber is removed, this unit can produce 1,000 to 1,300 pounds of forage per acre.

This unit is a good storage area for moisture in winter that can be released slowly in spring.

This map unit is in capability subclass VIe, nonirrigated. It is in High Mountain Loam (Mixed Conifer) woodland site.

134—Skutum very fine sandy loam, 1 to 6 percent slopes. This deep, moderately well drained soil is on bottom lands along the tributaries of the East Fork Sevier River. The soil formed in mixed alluvium derived dominantly from limestone, sandstone, and shale. Slopes are linear to concave and are medium to long. The present vegetation is mainly Douglas fir, ponderosa pine, white fir, and aspen. Elevation is 8,400 to 8,800 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 38 to 40 degrees F, and the freeze-free period is 60 to 70 days.

Typically, the surface is covered with a mat of aspen litter, duff, and twigs 1 inch thick. The surface layer is dark brown very fine sandy loam about 17 inches thick. The subsoil is brown gravelly clay and gravelly clay loam about 19 inches thick. The substratum to a depth of 50 inches is brownish yellow gravelly sandy loam. Fractured gray shale is at a depth of 50 inches. Depth to shale ranges from 50 to 60 inches.

Included in this unit are about 5 percent Kade soils adjacent to stream channels and 5 percent Losee gravelly loam and 5 percent Osote silty clay loam on small alluvial fans and cones. Also included are small areas of soils that are similar to this Skutum soil but that have slopes of 0 to 1 percent, are along stream channels, and are subject to rare periods of flooding.

Permeability of the Skutum soil is slow. Available water capacity is 6 to 7.5 inches. Water supplying capacity is 15 to 19 inches. Effective rooting depth is 50 to 60 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is slight.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of aspen and an understory of 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Important understory plants are bearded wheatgrass, mountain brome, blue grass, and mountain snowberry.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. This soil has few limitations. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand.

If the timber is removed, this unit can produce 1,000 to 1,300 pounds of forage per acre.

This unit is a good storage area for moisture in winter that can be released slowly in spring.

This map unit is in capability subclass VIe, nonirrigated. It is in High Mountain Loam (Aspen) woodland site.

135—Skutum fine sandy loam, 10 to 35 percent slopes. This deep, moderately well drained soil is on benches on the southern part of the Paunsaugunt Plateau adjacent to the East Fork Sevier River and its tributaries. The soil formed in colluvium and alluvium derived dominantly from limestone, sandstone, and shale. Slopes are convex to concave and are medium in length. The present vegetation is mainly aspen. Elevation is 8,200 to 8,600 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 60 to 70 days.

Typically, the surface is covered with a mat of aspen litter, duff, and twigs 1 inch thick. The surface layer is dark brown fine sandy loam about 6 inches thick. The next layer is brown fine sandy loam 11 inches thick. The subsoil is brown gravelly clay loam and gravelly clay 19 inches thick. The substratum to a depth of 50 inches is brownish yellow gravelly sandy loam. Shale is at a depth of 50 inches. Depth to shale ranges from 50 to 60 inches.

Included in this unit are about 10 percent Sevier very fine sandy loam on toe slopes; 5 percent sandstone Rock outcrop; and 5 percent Swapps gravelly loam, 5 to 25 percent slopes, on colluvial toe slopes that face north. Also included are small areas of sandy soils that are in small pockets.

Permeability of this Skutum soil is slow. Available water capacity is 5 to 6 inches. Water supplying capacity is 9 to 11 inches. Effective rooting depth is 50 to 60 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of aspen and an understory of 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Important understory plants are bearded wheatgrass, mountain brome, bluegrass, and mountain snowberry. This unit has high potential for the production of aspen. The site index for aspen is 70 to 85.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

If the timber is removed, this unit can produce 1,000 to 1,600 pounds of forage per acre.

This unit is a good source of topsoil for cut and fill areas.

This map unit is in capability subclass VIe, nonirrigated. It is in High Mountain Loam (Aspen) woodland site.

136—Swapps gravelly loam, 5 to 25 percent slopes. This moderately deep, well drained soil is on ridges and hills, mainly above the rim of the Paunsaugunt Plateau, between Rainbow Point and Whiteman Bench. The soil formed in colluvium and residuum derived dominantly from limestone and shale. Slopes are convex to concave and are medium in length. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,200 to 8,900 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 70 days.

Typically, the surface is covered with a mat of partially decomposed needles and twigs about 1 inch thick. The surface layer is brown gravelly loam about 3 inches thick. The subsoil is yellowish red gravelly loam about 5 inches thick. The upper 7 inches of the substratum is dark brown very gravelly loam, and the lower part to a depth of 36 inches is pink very gravelly loam. Limestone is at a depth of 36 inches. Depth to limestone ranges from 20 to 40 inches.

Included in this unit are small areas of Swapps soils that have slopes of 25 to 40 percent. Also included are small areas of soils that are similar to this Swapps soil but have bedrock at a depth of more than 40 inches and, in the vicinity of Willis Creek, soils that are more than 40 inches deep to bedrock and have slopes of 1 to 6 percent.

Permeability of this Swapps soil is moderate to bedrock. Available water capacity is 4 to 5 inches. Water supplying capacity is 9 to 12 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, common juniper, and Oregon grape.

The Swapps soil has moderate potential for the production of Douglas fir, ponderosa pine, and white fir. The site index for Douglas fir and ponderosa pine ranges from 50 to 65. The site index for white fir ranges from 45 to 60.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. The main concerns for producing and harvesting timber are seedling mortality and plant competition. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, this unit can produce 700 to 1,000 pounds of forage per acre.

This map unit is in capability subclass VIe, nonirrigated. It is in High Mountain Stony Loam (Mixed Conifer) woodland site.

137—Swapps gravelly loam, 25 to 65 percent slopes. This moderately deep, well drained soil is on the sides of ridges and mesas in and adjacent to Bryce Canyon National Park. It formed in colluvium and residuum derived dominantly from limestone and shale. Slopes are complex and short. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,200 to 9,600 feet. The average annual precipitation is 20 to 27 inches, the average annual air temperature is 36 to 42 degrees F, and the freeze-free period is 55 to 65 days.

Typically, the surface is covered with a mat of partially decomposed needles and twigs about 1 inch thick. The surface layer is brown gravelly loam about 9 inches thick. The subsoil is yellowish red cobbly clay loam 11 inches thick. The substratum is pink very cobbly loam 16 inches thick. Limestone is at a depth of 36 inches. Depth to limestone ranges from 20 to 40 inches.

Included in this unit are about 10 percent Losee gravelly loam, 10 percent soils that are similar to this Swapps soil but have a very cobbly subsoil, and 5 percent moderately deep soils that have a thick, dark colored surface layer.

Permeability of this Swapps soil is moderate to bedrock. Available water capacity is 3 to 4 inches. Water supplying capacity is 7 to 11 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

This unit has moderate potential for the production of Douglas fir, ponderosa pine, and white fir. The site index for Douglas fir and ponderosa pine is 50 to 65, and for white fir it is 45 to 60.

The main concerns for producing and harvesting timber are steepness of slope, seedling mortality, and plant competition. Conventional methods of harvesting timber can be used in areas where slopes are less than 45 percent and in steeper areas where slopes are 200 feet long or less. In areas where slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, this unit can produce 700 to 1,000 pounds of forage per acre.

This map unit is in capability subclass VIIe, nonirrigated. It is in High Mountain Stony Loam (Mixed Conifer) woodland site.

138—Syrett gravelly loam, 2 to 12 percent slopes. This moderately deep, well drained soil is on structural benches and toe slopes on Johnson Bench. The soil formed in colluvium and residuum derived dominantly from limestone. Slopes are convex to concave and are medium in length. The present vegetation is mainly ponderosa pine. Elevation is 7,600 to 8,400 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 90 days.

Typically, the surface layer is brown gravelly loam about 1 inch thick. The next layer is brown very gravelly loam 11 inches thick. The underlying material is reddish yellow and brown very gravelly silt loam and very gravelly loam 15 inches thick. Limestone is at a depth of 38 inches. Depth to bedrock ranges from 20 to 40 inches. In some areas the surface layer is sandy.

Included in this unit are about 10 percent Winetti gravelly sandy loam in swales, 5 percent Ahlstrom silt loam adjacent to stream channels, and 5 percent limestone Rock outcrop.

Permeability of this Syrett soil is moderate to bedrock. Available water capacity is 2 to 4 inches. Water supplying capacity is 4 to 8 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of ponderosa pine and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are muttongrass, Indian ricegrass, black sagebrush, and greenleaf manzanita.

This unit has moderate potential for the production of ponderosa pine. The site index for ponderosa pine is 50 to 65.

This unit has few limitations for the harvesting of timber. Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, this unit can produce 400 to 700 pounds of forage per acre.

This map unit is in capability subclass VIIs, nonirrigated. It is in Mountain Gravelly Loam (Ponderosa Pine) woodland site.

139—Syrett-Frandsen association, 1 to 12 percent slopes. This map unit is on benches, dissected alluvial fans, and foothills between Red Canyon and Hillsdale Canyon. Slopes are convex to concave and are medium to long. The present vegetation is mainly ponderosa pine on the Syrett soil and big sagebrush on the Frandsen soil. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 13 to 17 inches, the average annual air temperature is 42 to 45 degrees F, and the freeze-free period is 70 to 90 days.

This unit is 60 percent Syrett gravelly loam, 2 to 12 percent slopes, on convex benches and foothills; 30 percent Frandsen loam, 1 to 3 percent slopes, on dissected alluvial fans; and 10 percent other soils.

Included in this unit are about 5 percent Neto fine sandy loam and 5 percent Winetti gravelly sandy loam along intermittent stream channels.

The Syrett soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown gravelly loam about 1 inch thick. The next layer is brown very gravelly loam 11 inches thick. The underlying material is reddish yellow and brown very gravelly silt loam and very gravelly loam 21 inches thick. Limestone is at a depth of 38 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Syrett soil is moderate to bedrock. Available water capacity is 2 to 4 inches. Water supplying capacity is 4 to 7 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Frandsen soil is very deep and well drained. It formed in mixed alluvium derived dominantly from shale, limestone, and sandstone. Typically, the surface layer is pale brown loam about 2 inches thick. The upper 41 inches of the underlying layer is pale brown clay loam, and the lower part to a depth of 60 inches or more is very pale brown loam.

Permeability of the Frandsen soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 9 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is subject to rare periods of flooding.

This unit is used as woodland, rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Syrett soil is an overstory of ponderosa pine and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are Indian ricegrass, muttongrass, black sagebrush, and greenleaf manzanita.

The Syrett soil has moderate potential for the production of ponderosa pine. The site index for ponderosa pine is 50 to 65.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, the Syrett soil can produce 400 to 700 pounds of forage per acre.

The potential plant community on the Frandsen soil is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, blue grama, mountain big sagebrush, and winterfat.

The suitability of the Frandsen soil for rangeland seeding is good. Undesirable plants can be controlled by plowing, chaining, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage. This soil requires careful management because it is erodible, and gullies form easily if the plant cover is deteriorated.

This map unit is in capability subclass VIIs, nonirrigated. The Syrett soil is in Mountain Gravelly Loam (Ponderosa Pine) woodland site, and the Frandsen soil is in Upland Loam range site.

140—Syrett-Vanet gravelly loams, 20 to 40 percent slopes. This map unit is on sides of mesas north of East Creek and Mill Hollow, on the Paunsaugunt Plateau. Slopes are short. The present vegetation is mainly ponderosa pine. Elevation is 8,000 to 8,500 feet. The average annual precipitation is 16 to 22 inches, the average annual air temperature is 42 to 45 degrees F, and the average freeze-free period is 70 to 80 days.

This unit is 50 percent Syrett gravelly loam, 20 to 40 percent slopes; 40 percent Vanet gravelly loam, 20 to 40 percent slopes; and 10 percent other components. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent limestone Rock outcrop and 5 percent Hatch loam.

The Syrett soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown gravelly loam about 1 inch thick. The next layer is brown very gravelly loam 11 inches thick. The upper 11 inches of the substratum is brown very gravelly loam, and the lower part to a depth of 38 inches is reddish yellow very gravelly silt loam. Limestone is at a depth of 38 inches. Depth to limestone ranges from 20 to 40 inches.

Permeability of the Syrett soil is moderate. Available water capacity is 1.5 to 2.5 inches. Water supplying capacity is 4 to 8 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 4 to 6 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Vanet soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from shale and limestone. Typically, the surface layer is brown gravelly loam about 2 inches thick. The upper 5 inches of the subsoil is yellowish red gravelly clay loam, and the lower 4 inches is reddish brown very gravelly loam. The substratum is brown gravelly loam 3 inches thick. Soft limestone is at a depth of 14 inches. Depth to soft limestone ranges from 10 to 20 inches.

Permeability of the Vanet soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 4 to 8 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is moderately rapid, and the hazard of water erosion is severe.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on the Syrett soil is an overstory of ponderosa pine and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are muttongrass, Indian ricegrass, black sagebrush, and greenleaf manzanita.

The Syrett soil has moderate potential for the production of ponderosa pine. The site index for ponderosa pine is 50 to 65.

The potential plant community on the Vanet soil is an overstory of ponderosa pine and an understory of 25 percent grasses, 15 percent forbs, and 60 percent shrubs. Important understory plants are muttongrass, Indian ricegrass, sedge, greenleaf manzanita, and Utah serviceberry.

The Vanet soil has low potential for the production of ponderosa pine. The site index for ponderosa pine is 35 to 50.

The main concerns for producing and harvesting timber on this unit are steepness of slope, seedling mortality, and plant competition. Conventional methods of harvesting timber can be used. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees. Specialized methods of planting such as use of seedlings in containers or shade blocks may be needed to ensure successful regeneration.

If the timber is removed, the soils in this unit can produce 400 to 700 pounds of forage per acre.

This map unit is in capability subclass VIIs, nonirrigated. The Syrett soil is in Mountain Gravelly Loam (Ponderosa Pine) woodland site, and the Vanet soil is in Mountain Shallow Loam (Ponderosa Pine) woodland site.

141—Tebbs sandy loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans east of the Sevier River, extending from Hatch to Circleville Canyon and near Antimony. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are linear or slightly undulating and are long. The vegetation in areas not cultivated is mainly black sagebrush, Wyoming big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline sandy loam about 5 inches thick. The upper 23 inches of the underlying material is pale brown, moderately alkaline sandy loam, the next 7 inches is light gray, moderately alkaline loamy sand, and the lower part to a depth of 60 inches or more is very pale brown, moderately alkaline sandy loam.

Included in this unit are about 5 percent Bruman gravelly loam, 5 percent Grimm sandy loam, and 5 percent Notter gravelly coarse sandy loam.

Permeability of this Tebbs soil is moderately rapid. Available water capacity is 6.5 to 8.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as irrigated cropland, rangeland, and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are Indian ricegrass, needleandthread, blue grama, Wyoming big sagebrush, winterfat, and bottlebrush squirreltail. The suitability of this unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is low available water capacity. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. If furrow irrigation is used, water should be applied at frequent intervals and runs should be short. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

This map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Wyoming Big Sagebrush) range site.

142—Tebbs loam, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans and valley plains east of the Sevier River, extending from Panguitch to Bear Valley Junction. The soil formed in alluvium derived dominantly from mixed igneous rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly black sagebrush, Wyoming big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline loam 8 inches thick. The upper 12 inches of the underlying material is light brownish gray, moderately alkaline loam, the next 32 inches is light brownish gray, moderately alkaline sandy loam, and the lower part to a depth of 60 inches or more is light brownish gray, moderately alkaline loamy sand. In some areas the surface layer is sandy loam.

Included in this unit are about 5 percent Bruman loam; 5 percent Greenhalgh silt loam, 1 to 2 percent slopes; and 5 percent Neto very fine sandy loam, wet.

Permeability of the Tebbs soil is moderately rapid. Available water capacity to a depth of 60 inches or more is 7 to 9 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

Most areas of this unit are used as irrigated cropland. A few areas are used as rangeland and wildlife habitat.

The potential plant community on this unit is 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, needleandthread, blue grama, winterfat, and bottlebrush squirreltail. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

If this unit is used for irrigated crops, the main limitation is the low available water capacity. Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. In some areas the supply of irrigation water is inadequate after mid-season. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff.

The map unit is in capability subclasses III, irrigated, and VIe, nonirrigated. It is in Semidesert Loam (Wyoming Big Sagebrush) range site.

143—Tebbs loam, moist, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans in Johns Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are linear and long. The present vegetation in most areas is mainly mountain big sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is pale brown, moderately alkaline loam about 5 inches thick. The upper 31 inches of the underlying material is light brownish gray, moderately alkaline loam, and the lower part to a depth of 60 inches or more is pale brown, moderately alkaline sandy loam.

Included in this unit are about 10 percent Greenhalgh silt loam, 1 to 2 percent slopes, and 5 percent Notter Variant loam.

Permeability of the Tebbs soil is moderately rapid. Available water capacity is 6.5 to 9.0 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are mountain big sagebrush, Indian ricegrass, blue grama, and winterfat. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam range site.

144—Tolman very cobbly silt loam, 8 to 35 percent slopes. This shallow, well drained soil is on mountainsides and ridges in the Dog Valley area. The soil formed in residuum derived dominantly from basic and intermediate igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly mountain big sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the average freeze-free period is 70 to 100 days.

Typically, the surface layer is brown very cobbly silt loam about 12 inches thick. The subsoil is brown very cobbly clay loam about 4 inches thick. Igneous rock is at a depth of 16 inches. Depth to igneous rock ranges from 10 to 20 inches.

Included in this unit are about 10 percent Harol very cobbly loam that has slopes of 2 to 15 percent and is on alluvial fans and 5 percent Dalcan very cobbly loam. Also included are small areas of Lava flows in the Mammoth and Asay Creeks area.

Permeability of the Tolman soil is moderate. Available water capacity is 1 to 2 inches. Water supplying capacity is 2.0 to 4.5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important plants are Indian ricegrass, mountain big sagebrush, black sagebrush, Nevada bluegrass, antelope bitterbrush, and bluebunch wheatgrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity and depth to bedrock.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Loam range site.

145—Tolman-Rock outcrop complex, 25 to 40 percent slopes. This map unit is on mountainsides and ridges in the Dog Valley area. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the average freeze-free period is 70 to 100 days.

This unit is 65 percent Tolman very cobbly loam, 25 to 40 percent slopes, 25 percent Rock outcrop, and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Dalcan very cobbly loam and 5 percent Harol very cobbly loam that has slopes of 2 to 15 percent. Also included are small areas of Tolman very cobbly silt loam.

The Tolman soil is shallow and well drained. It formed in residuum derived dominantly from basic and intermediate igneous rock. Typically, the surface layer is brown very cobbly loam about 3 inches thick. The subsoil is brown very cobbly clay loam 14 inches thick. Igneous rock is at a depth of 17 inches. Depth to igneous rock ranges from 10 to 20 inches.

Permeability of the Tolman soil is moderate. Available water capacity is 1 to 2 inches. Water supplying capacity is 2.0 to 4.6 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important understory plants are Indian ricegrass, mountain big sagebrush, antelope bitterbrush, and bluebunch wheatgrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity and shallow rooting depth.

This map unit is in capability subclass VIIs, nonirrigated. The Tolman soil is in Upland Shallow Loam (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a woodland site.

146—Tridell loam, 2 to 4 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Panguitch, Hatch, and Antimony. The soil formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are slightly undulating and are medium in length. The vegetation in areas not cultivated is mainly black sagebrush, Wyoming big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown loam about 8 inches thick. The upper 12 inches of the underlying material is light gray very cobbly loam, and the lower part to a depth of 60 inches or more is pale brown very gravelly sandy loam. A layer of lime accumulation is at a depth of about 8 inches.

Included in this unit are about 10 percent Notter loam and 5 percent Bruman loam.

Permeability of this Tridell soil is moderately rapid. Available water capacity is 4.0 to 6.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 40 percent grasses, 10 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, Indian ricegrass, Wyoming big sagebrush, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitations are the low precipitation and low available water capacity. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals.

This unit is suited to production of hay and small grain. The main limitations are the short growing season and low available water capacity. In some areas the supply of irrigation water is inadequate after mid-season. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. If furrow irrigation is used, water should be applied at frequent intervals and runs should be short.

This map unit is in capability subclasses IIIs, irrigated, and VIs, nonirrigated. It is in Semidesert Stony Loam range site.

147—Tridell gravelly loam, moist, 4 to 25 percent slopes. This very deep, well drained soil is on dissected alluvial fans in Panguitch and Johns Valleys. The soil formed in alluvium derived dominantly from mixed igneous and sedimentary rock. Slopes are undulating and short. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the upper part of the surface layer is dark grayish brown gravelly loam about 7 inches thick and the lower part is brown gravelly loam 7 inches thick. The substratum to a depth of 60 inches or more is light brown extremely gravelly sandy loam. A layer of lime accumulation is at a depth of about 14 inches. In some areas the surface layer is very cobbly.

Included in this unit are about 10 percent Luhon loam, moist, and 5 percent Notter loam, moist.

Permeability of this Tridell soil is moderately rapid. Available water capacity to a depth of 60 inches is 4.5 to 6.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are black sagebrush, Indian ricegrass, antelope bitterbrush, and mountain big sagebrush. The suitability of the unit for rangeland seeding is fair. The main limitations are the low precipitation, low available water capacity, the gravelly surface layer, and slope. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

148—Tridell cobbly loam, 4 to 25 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Dog Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are undulating and short. The present vegetation in most areas is mainly black sagebrush, Wyoming big sagebrush, and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown cobbly loam about 8 inches thick. The next layer is very pale brown extremely cobbly loam 19 inches thick. The upper 14 inches of the underlying material is light brownish gray extremely cobbly sand, the next 7 inches is brown gravelly loam, and the lower part to a depth of 60 inches or more is pinkish white cobbly loam. A layer of lime accumulation is at a depth of about 8 inches.

Included in this unit are about 10 percent Notter gravelly loam and 5 percent Bruman very cobbly loam that has slopes of 5 to 30 percent.

Permeability of this Tridell soil is moderately rapid. Available water capacity is 4.5 to 6.5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 40 percent grasses, 10 percent forbs, and 50 percent shrubs. Important plants are black sagebrush, Wyoming big sagebrush, Indian ricegrass, blue grama, and needleandthread. The suitability of the unit for rangeland seeding is poor. The main limitation is low precipitation. Undesirable plants can be controlled by railing, burning, or spraying with chemicals.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Stony Loam range site.

149—Tridell, moist-Rock outcrop complex, 25 to 50 percent slopes. This map unit is on mountainsides south and west of Circle Valley and in Johns Valley. Slopes are convex and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 65 percent Tridell very cobbly loam, moist, 25 to 50 percent slopes; 15 percent Rock outcrop; and 20 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Comodore extremely cobbly clay loam, 5 percent Ipson cobbly loam, and 5 percent Tolman very cobbly loam.

The Tridell soil is very deep and well drained. It formed in alluvium derived dominantly from basic and intermediate igneous rock. Typically, the surface layer is dark grayish brown very cobbly loam about 7 inches thick. The upper 13 inches of the underlying material is pale brown very stony loam, and the lower part to a depth of 60 inches or more is light brownish gray very stony loam. A layer of lime accumulation is at a depth of about 7 inches.

Permeability of the Tridell soil is moderately rapid. Available water capacity is 3.5 to 5.0 inches. Water supplying capacity is 5 to 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Tridell soil is an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are black sagebrush, mountain big sagebrush, antelope bitterbrush, bluegrass, and Indian ricegrass. The suitability of the soil for rangeland seeding is very poor. The main limitations are the steepness of slope and the areas of Rock outcrop.

This map unit is in capability subclass VIIs, nonirrigated. The Tridell soil is in Upland Stony Loam (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a woodland site.

150—Ustic Torrifluvents, occasionally flooded, 2 to 8 percent slopes. These very deep, well drained soils are on alluvial fans in the Tropic area and in Johns Valley. The soils formed in alluvium derived dominantly from limestone and sandstone. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is brown sandy loam about 11 inches thick. The upper 10 inches of the underlying material is light brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is pink extremely gravelly coarse sandy loam.

Included in this unit are about 10 percent Henrieville sandy loam that has slopes of 1 to 2 percent and 5 percent Mikim loam that is dry and has slopes of 1 to 2 percent.

Permeability of these Ustic Torrifluvents is moderately rapid. Available water capacity is 3 to 4 inches. Water supplying capacity is 4.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate. These soils are subject to occasional periods of flooding.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 40 percent grasses, 5 percent forbs, and 55 percent shrubs. Important understory plants are green Mormon tea, rock goldenrod, and blue grama. The suitability of the unit for rangeland seeding is fair. The main limitations are low precipitation and slope. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) (D35) range site.

151—Venture cobbly loam, 4 to 30 percent slopes. This shallow, well drained soil is on mountainsides and ridges southwest of Circle Valley. The soil formed in residuum and colluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex and are short. The present vegetation in most areas is mainly pinyon, Utah juniper, sagebrush, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown cobbly loam about 6 inches thick. The upper 4 inches of the subsoil is brown very gravelly clay loam, and the lower 5 inches is pale brown very gravelly clay loam. An indurated, lime-cemented hardpan is at a depth of 15 inches. Depth to the hardpan ranges from 10 to 20 inches. A layer of lime accumulation is at a depth of about 10 inches.

Included in this unit are 10 percent Tolman very cobbly loam and 5 percent Dalcan very cobbly loam that is dry.

Permeability of the Venture soil is moderately slow. Available water capacity is 1 to 2 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are black sagebrush, Nevada bluegrass, Sandberg bluegrass, big sagebrush, and antelope bitterbrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity and shallow depth to the hardpan. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by mechanical treatment or prescribed burning.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Hardpan (Pinyon-Juniper) woodland site.

152—Venture very cobbly silt loam, 4 to 25 percent slopes. This shallow, well drained soil is on mountainsides and ridges in Dog Valley and south of Panguitch. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex and are short. The present vegetation in most areas is mainly big sagebrush. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark grayish brown very cobbly silt loam about 6 inches thick. The upper 4 inches of the subsoil is brown very gravelly clay loam, and the lower 5 inches is pale brown very gravelly clay loam. An indurated, lime-cemented hardpan is at a depth of 15 inches. Depth to the hardpan ranges from 10 to 20 inches. A layer of lime accumulation is at a depth of 10 to 15 inches.

Included in this unit are about 5 percent Quilt very cobbly loam that has slopes of 4 to 25 percent, 5 percent Dalcan very cobbly loam that is dry, and 5 percent Harol very cobbly loam that has slopes of 2 to 15 percent.

Permeability of the Venture soil is moderately slow. Available water capacity is 1.0 to 1.5 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important plants are black sagebrush, bluegrass, big sagebrush, and antelope bitterbrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity and shallow depth to the hardpan. Undesirable plants can be controlled by spraying with chemicals.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Hardpan range site.

153—Venture cobbly loam, dry, 8 to 25 percent slopes. This shallow, well drained soil is on ridges south and west of Antimony, northeast of Bear Valley

Junction, and in Johns Valley. The soil formed in residuum and colluvium derived dominantly from basic and intermediate igneous rock. Slopes are linear in shape and medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is dark brown cobbly loam about 4 inches thick. The subsoil is yellowish brown very cobbly clay loam 15 inches thick. An indurated, lime-cemented hardpan is at a depth of 19 inches. Depth to the hardpan ranges from 10 to 20 inches. A layer of lime accumulation is at a depth of about 13 inches.

Included in this unit are about 10 percent Bruman very cobbly loam that has slopes of 5 to 30 percent and 5 percent Comodore extremely cobbly clay loam.

Permeability of this Venture soil is moderately slow to the hardpan. Available water capacity is 1.5 to 2.0 inches. Water supplying capacity is 2.0 to 4.5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, needleandthread, blue grama, Mormon tea, and Douglas rabbitbrush. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity and shallow depth to the hardpan. Undesirable plants can be controlled by spraying with chemicals.

This map unit is in capability subclass VIIs, nonirrigated. It is in Semidesert Shallow Loam range site.

154—Villy Family silty clay loam, 0 to 2 percent slopes. These very deep, poorly drained soils are on valley flood plains in Panguitch and Johns Valleys. The soils formed in alluvium derived dominantly from mixed igneous rock. Slopes are linear and long. The vegetation in areas not cultivated is mainly grasses and sedges. Elevation is 6,500 to 7,200 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

No single profile is typical, but one commonly observed in the survey area has a mat of decomposing litter 2 inches thick on the surface. The surface layer is light brownish gray silty clay loam about 11 inches thick. The underlying material to a depth of 60 inches or more is white, gray, and light gray silty clay loam.

Included in this unit are about 10 percent medium textured soils that are somewhat poorly drained and are in higher areas and 5 percent Jodero loam on alluvial fans. Also included are small areas of Borollic Natrargids on stream terraces near the East Fork Sevier River, in Johns Valley.

Permeability of these Villy Family soils is moderately slow. Available water capacity to a depth of 60 inches is 10 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is slow, and the hazard of water erosion is slight. These soils are slightly saline. They are subject to rare periods of flooding.

This unit is used for irrigated pasture and as rangeland.

The potential plant community on this unit is 85 percent grasses, 10 percent forbs, and 5 percent shrubs. Important plants are sedge, Kentucky bluegrass, baltic rush, and redtop. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by spraying with chemicals. A seasonal high water table fluctuates between depths of 10 and 35 inches in most years.

This map unit is in capability subclass VIw, nonirrigated. It is in Wet Fresh Meadow range site.

155—Waltershow extremely cobbly loam, 8 to 40 percent slopes. This very deep, well drained soil is on mountainsides in Panguitch and Dog Valleys. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are concave to convex and are short. The present vegetation in most areas is mainly pinyon, Utah juniper, mountain big sagebrush, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown extremely cobbly loam about 3 inches thick. The upper 7 inches of the subsoil is brown very cobbly clay, and the lower 10 inches is light brownish gray very cobbly clay loam. The upper 19 inches of the substratum is light gray and white extremely gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brownish gray extremely gravelly sand. A layer of lime accumulation is at a depth of about 20 to 39 inches.

Included in this unit are about 10 percent Venture cobbly loam that has slopes of 4 to 30 percent slopes and 5 percent Tridell cobbly loam. Also included are small areas of Notter very cobbly loam and Waltershow soils that have slopes of 4 to 8 percent.

Permeability of the Waltershow soil is slow. Available water capacity to a depth of 60 inches or more is 3 to 5 inches. Water supplying capacity is 5 to 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are black sagebrush, mountain big sagebrush, antelope bitterbrush, bluegrass, and Indian ricegrass. The suitability of the unit for rangeland seeding is poor. The main limitations are the low available water capacity, the extremely cobbly surface layer, and slope. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

156—Waltershow extremely cobbly loam, 40 to 60 percent slopes. This very deep, well drained soil is on mountainsides in Panguitch and Dog Valleys. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, mountain big sagebrush, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown extremely cobbly loam about 3 inches thick. The upper 7 inches of the subsoil is brown very cobbly clay, and the lower 10 inches is light brownish gray very cobbly clay loam. The upper 19 inches of the substratum is light gray and white extremely gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brownish gray extremely gravelly sand. A layer of lime accumulation is at a depth of about 20 inches.

Included in this unit are about 10 percent Venture cobbly loam and 5 percent Tridell very cobbly loam. Also included are small areas of Notter very cobbly loam.

Permeability of this Waltershow soil is slow. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are black sagebrush, mountain big sagebrush, bluegrass, and Indian ricegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the extremely cobbly surface layer and steepness of slope.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

157—Waltershow-Venture-Rock outcrop complex, 4 to 40 percent slopes. This map unit is on mountainsides near Dog Valley and southwest of Circle Valley. Slopes are concave to convex and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

This unit is 55 percent Waltershow extremely cobbly loam, 15 to 40 percent slopes; 15 percent Venture cobbly loam, 4 to 30 percent slopes; 15 percent Rock outcrop; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Notter very cobbly loam and 5 percent Venture very cobbly silt loam.

The Waltershow soil is very deep and well drained. It formed in alluvium derived dominantly from basic and intermediate igneous rock. Typically, the surface layer is brown extremely cobbly loam about 3 inches thick. The upper 7 inches of the subsoil is brown very cobbly clay, and the lower 10 inches is light brownish gray very cobbly clay loam. The upper 19 inches of the substratum is light gray and white extremely gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brownish gray extremely gravelly sand.

A layer of lime accumulation is at a depth of about 20 inches.

Permeability of this Waltershow soil is slow. Available water capacity is 3 to 5 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Venture soil is shallow and well drained. It formed in alluvium derived dominantly from basic and intermediate igneous rock. Typically, the surface layer is dark grayish brown cobbly loam about 6 inches thick. The upper 4 inches of the subsoil is brown very gravelly clay loam, and the lower 5 inches is pale brown very gravelly clay loam. An indurated, lime-cemented hardpan is at a depth of 15 inches. Depth to the hardpan ranges from 10 to 20 inches.

Permeability of the Venture soil is moderately slow. Available water capacity is 1.0 to 2.5 inches. Water supplying capacity is 2 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Waltershow soil is an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are black sagebrush, mountain big sagebrush, bluegrass, and Indian ricegrass.

The potential plant community on the Venture soil is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are black sagebrush, Nevada bluegrass, antelope bitterbrush, and big sagebrush.

The suitability of this unit for rangeland seeding is very poor. The main limitations are the shallow depth of the Venture soil and the areas of Rock outcrop.

This map unit is in capability subclass VIIs, nonirrigated. The Waltershow soil is in Upland Stony Loam (Pinyon-Juniper) woodland site, and the Venture soil is in Upland Shallow Hardpan (Pinyon-Juniper) woodland site. Rock outcrop is not placed in a woodland site.

158—Whiteman very cobbly very fine sandy loam, 1 to 6 percent slopes. This shallow, somewhat excessively drained soil is on the tops of mesas and ridges in the vicinity of Whiteman Bench, on the Paunsaugunt Plateau. The soil formed in residuum derived dominantly from limestone. Slopes are convex to concave and are medium in length. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir. Elevation is 8,200 to 8,900 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the average freeze-free period is 60 to 75 days.

Typically, the surface layer is brown very cobbly very fine sandy loam about 2 inches thick. The subsoil is reddish brown very cobbly clay loam 9 inches thick. Limestone is at a depth of 11 inches. Depth to limestone ranges from 10 to 18 inches.

Included in this unit are about 10 percent Pahreah very gravelly loam, 5 percent Brycan very fine sandy loam that has slopes of 1 to 6 percent and is in depressional areas, and 5 percent limestone Rock outcrop. Also included are areas of Whiteman soils, on the sides of mesas between Miller and Sieler Creeks and near Rainbow Point, that have slopes of as much as 30 percent and have a loam surface layer.

Permeability of this Whiteman soil is slow. Available water capacity is 1 to 2 inches. Water supplying capacity is 3 to 7 inches. Effective rooting depth is 10 to 18 inches. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as woodland. It is also used as wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

This unit has low potential for the production of ponderosa pine, Douglas fir, and white fir. The site index is 35 to 50 for ponderosa pine, 40 to 50 for Douglas fir, and 30 to 45 for white fir.

Conventional methods of harvesting timber can be used. The main concerns for producing and harvesting timber are shallow depth to bedrock, low available water capacity, seedling mortality, and rock fragments in the surface layer. Trees are subject to windthrow because of the limited rooting depth. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, this unit can produce 400 to 700 pounds of forage per acre.

This map unit is in capability subclass VIIs, nonirrigated. It is in High Mountain Shallow Stony Loam (Mixed Conifer) woodland site.

159—Whiteman-Skutum association, 10 to 70 percent slopes. This map unit is on ridges and benches along the breaks of the Paunsaugunt Plateau, between Big Hollow and Kanab Creek. Slopes are complex and short. The present vegetation is mainly Douglas fir, ponderosa pine, and white fir on the Whiteman soil and aspen on the Skutum soil. Elevation is 8,200 to 8,800 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 42 degrees F, and the average freeze-free period is 60 to 75 days.

This unit is 50 percent Whiteman very cobbly fine sandy loam, 30 to 70 percent slopes, on north exposures of ridges and benches; 30 percent Skutum fine sandy loam, 10 to 35 percent slopes, on convex tops of ridges and benches; and 20 percent other soils and Rock outcrop.

Included in this unit are about 10 percent Sevier soils on south exposures of ridges and benches, 5 percent Swapps gravelly loam that has slopes of 25 to 65 percent, and 5 percent Rock outcrop.

The Whiteman soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from limestone. Typically, the surface layer is brown very cobbly fine sandy loam about 2 inches thick. The subsoil is reddish brown very cobbly clay loam 9 inches thick. Limestone is at a depth of 11 inches. Depth to limestone ranges from 10 to 18 inches.

Permeability of the Whiteman soil is slow. Available water capacity is 1 to 2 inches. Water supplying capacity is 3 to 7 inches. Effective rooting depth is 10 to 18 inches. The organic matter content of the surface layer is 2 to 4 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Skutum soil is deep and moderately well drained. It formed in alluvium derived dominantly from sandstone, limestone, and shale. Typically, the surface is covered with a mat of aspen litter, duff, and twigs 1 inch thick. The surface layer is dark brown and brown fine sandy loam about 17 inches thick. The upper 7 inches of the subsoil is brown gravelly clay loam, and the lower 12 inches is brown and very dark gray gravelly clay. The substratum to a depth of 50 inches or more is brownish yellow gravelly sandy loam. Fractured shale is at a depth of 50 to 60 inches.

Permeability of the Skutum soil is slow. Available water capacity is 5 to 6 inches. Water supplying capacity is 10 to 13 inches. Effective rooting depth is 50 to 60 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on the Whiteman soil is an overstory of Douglas fir, ponderosa pine, and white fir and an understory of 45 percent grasses, 15 percent forbs, and 40 percent shrubs. Important understory plants are dryland sedge, mountain brome, mountain snowberry, and common juniper.

The Whiteman soil has low potential for the production of ponderosa pine, Douglas fir, and white fir. The site index for ponderosa pine is 35 to 50; for white fir, 30 to 45; and for Douglas fir, 40 to 50.

Conventional methods of harvesting timber can be used in areas where slopes are less than 45 percent and in steeper areas where the slopes are 200 feet long or less. In areas where slopes are more than 45 percent and are more than 200 feet long, cable logging or other specialized logging methods can be used for harvesting timber. The main concerns for producing and harvesting timber are steepness of slope, low productivity, and seedling mortality. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

The potential plant community on the Skutum soil is an overstory of aspen and an understory of 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Important understory plants are bearded wheatgrass, mountain brome, bluegrass, and mountain snowberry.

The Skutum soil has high potential for the production of aspen. The site index for aspen ranges from 70 to 85.

Conventional methods of harvesting timber generally are suitable, but the soil may be compacted if heavy equipment is used when the soil is moist. Trees commonly are subject to windthrow during periods when the soil is excessively wet and winds are strong.

If the timber is removed, the Whiteman soil can produce 200 to 400 pounds of forage per acre and the

Skutum soil can produce 1,000 to 1,600 pounds per acre.

The Whiteman soil is in capability subclass VIIs, nonirrigated, and the Skutum soil is in capability subclass VIe, nonirrigated. The Whiteman soil is in High Mountain Shallow Stony Loam (Mixed Conifer) woodland site, and the Skutum soil is in High Mountain Loam (Aspen) woodland site.

160—Widtsoe gravelly sandy loam, 8 to 40 percent slopes. This very deep, well drained soil is on mountainsides and ridges west of Antimony and on the west side of Johns Valley. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are undulating and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the average freeze-free period is 70 to 100 days.

Typically, the surface layer is grayish brown gravelly sandy loam about 8 inches thick. The subsoil is reddish brown very gravelly clay loam 7 inches thick. The upper 4 inches of the substratum is pink very cobbly clay loam, the next 12 inches is brown very cobbly loamy sand, and the lower part to a depth of 60 inches or more is pinkish white and reddish brown extremely cobbly sandy loam. A layer of lime accumulation is at a depth of about 15 inches.

Included in this unit are about 10 percent Harol very cobbly loam that has slopes of 15 to 40 percent and is on mountainsides and 5 percent Circleville very gravelly loam on ridgetops.

Permeability of this Widtsoe soil is moderately slow. Available water capacity to a depth of 60 inches is 3.5 to 5.5 inches. Water supplying capacity is 5.0 to 8.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are Indian ricegrass, bluegrass, black sagebrush, mountain big sagebrush, and antelope bitterbrush. The suitability of the unit for rangeland seeding is poor. The main limitations are the steepness of slope and low available water capacity. Brush can be controlled by mechanical treatment or application of chemicals. Pinyon and juniper can be removed by chaining or prescribed burning.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Stony Loam (Pinyon-Juniper) woodland site.

161—Wiggler channery loam, 20 to 50 percent slopes. This shallow, well drained soil is on mountainsides south of Hatch and in the vicinity of Mammoth and Asay Creeks. The soil formed in residuum and colluvium derived dominantly from shale. Slopes are convex and are medium in length. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 7,300 to 8,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is gray channery loam about 4 inches thick. The upper 5 inches of the underlying material is light gray loam, and the lower part to a depth of 18 inches is white loam. Weathered shale is at a depth of 18 inches. Depth to shale ranges from 8 to 20 inches.

Included in this unit are about 5 percent Zinzer loam and 5 percent Guben gravelly loam. Also included are areas of Wiggler soils that have slopes of 10 to 20 percent.

Permeability of this Wiggler soil is moderate. Available water capacity is 2.5 to 3.5 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are Nevada bluegrass, Indian ricegrass, birchleaf mountainmahogany, Fremont mahonia, and Utah serviceberry. The suitability of the unit for rangeland seeding is very poor. The main limitations are the shallow depth of the soil and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Clay (Pinyon-Juniper) woodland site.

162—Wiggler-Guben complex, 25 to 50 percent slopes. This map unit is on mountainsides in the vicinity of Mammoth and Asay Creeks. Slopes are convex and are medium in length. The present vegetation in most areas is mainly ponderosa pine, shrubs, and grasses. Elevation is 7,600 to 8,300 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 42 degrees F, and the freeze-free period is 50 to 75 days.

This unit is 45 percent Wiggler very cobbly loam, 25 to 50 percent slopes; 40 percent Guben very gravelly loam, 25 to 50 percent slopes; and 15 percent other components. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Podo very gravelly loam that has slopes of 10 to 50 percent slopes and is in areas adjacent to Rock outcrop and 5 percent Rock outcrop and Badland.

The Wiggler soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from shale. Typically, the surface layer is gray very cobbly loam about 7 inches thick. The upper part of the underlying material is light gray loam 5 inches thick, and the lower part to a depth of 19 inches is light gray clay loam. Weathered shale is at a depth of 19 inches. Depth to shale ranges from 8 to 20 inches.

Permeability of the Wiggler soil is moderate. Available water capacity is 2.5 to 3.5 inches. Water supplying capacity is 5 to 7 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Guben soil is very deep and well drained. It formed in alluvium derived dominantly from sandstone and limestone. Typically, the surface layer is brown very gravelly loam about 8 inches thick. The subsoil is very pale brown very gravelly loam 7 inches thick. The upper 21 inches of the substratum is very pale brown very gravelly loam, and the lower part to a depth of 60 inches or more is very pale brown very gravelly loam.

Permeability of the Guben soil is moderate. Available water capacity is 4 to 5 inches. Water supplying capacity is 6 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Wiggler soil is an overstory of ponderosa pine and an understory of 25 percent grasses, 15 percent forbs, and 60 percent shrubs. Important understory plants are Gambel oak, greenleaf manzanita, muttongrass, and Nevada bluegrass.

The potential plant community on the Guben soil is an overstory of ponderosa pine and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are Indian ricegrass, muttongrass, black sagebrush, and greenleaf manzanita.

The suitability of this unit for rangeland seeding is very poor. The main limitations are the shallow depth of the Wiggler soil and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. The Wiggler soil is in Mountain Shallow Loam (Ponderosa Pine) woodland site, and the Guben soil is in Mountain Gravelly Loam (Ponderosa Pine) woodland site.

163—Wiggler-Rock outcrop-Podo complex, 50 to 70 percent slopes. This map unit is on mountainsides along Coal Pit Wash and in the Mammoth Creek area. Slopes are convex and are medium in length. The present vegetation in most areas is mainly ponderosa pine, Rocky Mountain juniper, shrubs, and grasses. Elevation is 7,600 to 8,300 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 42 degrees F, and the freeze-free period is 55 to 75 days.

This unit is 40 percent Wiggler channery clay loam, 50 to 70 percent slopes; 25 percent Rock outcrop; 20 percent Podo very gravelly loam, 50 to 70 percent slopes; and 15 percent other soils and Badland. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Badland and 5 percent soils that are similar to the Podo soil but are 20 to 40 inches deep to sandstone.

The Wiggler soil is shallow and well drained. It formed in residuum derived dominantly from shale. Typically, the Wiggler soil is very pale brown channery clay loam about 12 inches thick over weathered shale. Depth to shale ranges from 8 to 20 inches.

Permeability of the Wiggler soil is moderate. Available water capacity is 1 to 2 inches. Water supplying capacity is 2.5 to 5.0 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

The Podo soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is reddish yellow very gravelly loam about 5 inches thick. The underlying material to a depth of 13 inches is light brown gravelly loam. Sandstone is at a depth of 13 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is 1.5 to 2.0 inches. Water supplying capacity is 2 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as grazeable woodland and wildlife habitat.

The potential plant community on the Wiggler and Podo soils is an overstory of ponderosa pine and an understory of 25 percent grasses, 15 percent forbs, and 60 percent shrubs. Important understory plants are Gambel oak, greenleaf manzanita, muttongrass, and Nevada bluegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the shallow depth of the soils, the areas of Rock outcrop, and steepness of slope.

This map unit is in capability class VIII. The Wiggler and Podo soils are in Mountain Shallow Loam (Ponderosa Pine) woodland site. Rock outcrop is not placed in a woodland site.

164—Winetti gravelly sandy loam, 2 to 7 percent slopes. This very deep, somewhat excessively drained soil is on long narrow bottom lands along streams that extend down the sides of Paunsaugunt Plateau. The soil formed in mixed alluvium derived dominantly from sandstone, limestone, and shale. Slopes are plane and are medium to long. The present vegetation is mainly ponderosa pine. Elevation is 7,200 to 8,000 feet. The average annual precipitation is 14 to 18 inches, the average annual air temperature is 42 to 45 degrees F, and the average freeze-free period is 80 to 90 days.

Typically, the surface layer is brown gravelly sandy loam about 4 inches thick. The upper 20 inches of the substratum is stratified, light yellowish brown, brown, and yellowish red gravelly loamy sand, gravelly sandy loam, and sandy loam, and the lower part to a depth of 60 inches or more is yellowish red very gravelly sandy loam.

Included in this unit are about 10 percent Neto fine sandy loam and 10 percent Riverwash.

Permeability of the Winetti soil is moderately rapid. Available water capacity is 3 to 5 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. The soil is subject to rare periods of flooding.

This unit is used as woodland, rangeland, wildlife habitat, watershed, and recreation areas.

The potential plant community on this unit is an overstory of ponderosa pine and an understory of 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Important understory plants are muttongrass, Indian ricegrass, black sagebrush, and greenleaf manzanita.

This unit has low potential for the production of ponderosa pine. The site index for ponderosa pine is 35 to 50.

The main concerns for producing and harvesting timber are the low available water capacity and seedling mortality. Conventional methods of harvesting timber can be used. If planting sites are not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Hand planting of nursery stock usually is necessary to establish or improve a stand. Rock fragments in the upper 12 inches of the soil may restrict the use of power augers when planting trees.

If the timber is removed, this unit can produce 200 to 400 pounds of forage per acre.

This map unit is in capability subclass VIs, nonirrigated. It is in Mountain Gravelly Loam (Ponderosa Pine) woodland site.

165—Winnemucca-Hoodle association, 5 to 30 percent slopes. This map unit is on a pediment that has a mantle of gravelly volcanic alluvium. The pediment has been dissected by intermittent streams, which has resulted in long, narrow, east-west oriented ridges that have moderately steep side slopes. The unit is between Pole Canyon and Cottonwood Creek, on the eastern slopes of the Sevier Plateau. Slopes are convex to concave and are medium in length. The present vegetation is mainly big sagebrush. Elevation is 8,500 to 10,000 feet. The average annual precipitation is 18 to 26 inches, the average annual air temperature is 36 to 42 degrees F, and the average freeze-free period is 50 to 65 days.

This unit is 50 percent Winnemucca gravelly loam, 15 to 30 percent slopes, on north and south aspects of ridges; 35 percent Hoodle gravelly loam, 5 to 10 percent slopes, on convex ridgetops; and 15 percent other soils and Riverwash.

Included in this unit are about 5 percent Callings loam, 5 percent Behanin loam on north aspects, and 5 percent Mitch silt loam and Riverwash along intermittent stream channels.

The Winnemucca soil is very deep and well drained. It formed in alluvium derived dominantly from intermediate volcanic rock. Typically, the surface layer is very dark grayish brown gravelly loam about 16 inches thick. The upper 7 inches of the subsoil is brown very cobbly clay, and the lower 9 inches is brown extremely cobbly clay loam. The substratum to a depth of 60 inches or more is light brown extremely cobbly clay loam.

Permeability of the Winnemucca soil is slow. Available water capacity is 5 to 7 inches. Water supplying capacity is 9 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Hoodle soil is very deep and well drained. It formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Typically, the surface layer is grayish brown and dark grayish brown gravelly loam about 9 inches thick. The upper 4 inches of the subsoil is brown very gravelly sandy clay loam, and the lower 6 inches is yellowish brown very cobbly sandy clay loam. The next layer is yellowish brown extremely cobbly sandy loam 8 inches thick. The substratum to a depth of 60 inches or more is yellowish brown extremely cobbly sandy loam.

Permeability of the Hoodle soil is moderate. Available water capacity is 3 to 5 inches. Water supplying capacity is 8 to 11 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It is also used for wildlife habitat, watershed, and recreation areas.

The potential plant community on the soils in this unit is 65 percent grasses, 20 percent forbs, and 15 percent shrubs. Important plants are bluebunch wheatgrass, mountain brome, and mountain big sagebrush. The suitability of the unit for rangeland seeding is good. Undesirable plants can be controlled by chaining, burning, or spraying with chemicals.

This unit is a good storage area for winter moisture.

The Hoodle soil produces habitat that is critical for wintering sage grouse.

This map unit is in capability subclass VIe, nonirrigated. It is in Mountain Loam range site.

166—Yarts loam, 1 to 2 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Cannonville. It formed in alluvium derived dominantly from sandstone and shale. Slopes are linear and are medium in length. The vegetation in areas not cultivated is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light reddish brown, moderately alkaline loam about 7 inches thick. The upper 15 inches of the underlying material is reddish brown, moderately alkaline loam, and the lower part to a depth of 60 inches or more is light reddish brown, moderately alkaline fine sandy loam.

Included in this unit are about 10 percent Yarts sandy loam and 5 percent Henrieville sandy loam that has slopes of 1 to 2 percent.

Permeability of this Yarts soil is moderately rapid. Available water capacity is 7 to 9 inches. Water supplying capacity is 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 2.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for irrigated crops, rangeland, and wildlife habitat.

This unit is suited to the production of hay and small grain. Furrow, border, corrugation, and sprinkler irrigation systems are suited to the unit. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, galleta, winterfat, and fourwing saltbush. The suitability of the unit for rangeland seeding is poor. The main limitation is the low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclasses IIe, irrigated, and VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

167—Yarts sandy loam, 2 to 5 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Cannonville and Yellow Creek. The soil formed in alluvium derived dominantly from sandstone and shale. Slopes are linear and are medium in length. The vegetation in areas not cultivated is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F. and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brown, moderately alkaline sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is light reddish brown, moderately alkaline fine sandy loam.

Included in this unit are about 10 percent Mikim loam, dry, and 5 percent Henrieville sandy loam, 2 to 5 percent slopes.

Permeability of this Yarts soil is moderately rapid. Available water capacity is 6.5 to 8.0 inches. Water supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, irrigated cropland, and wildlife habitat.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, galleta, winterfat, and fourwing saltbush. The suitability of the unit for rangeland seeding is poor. The main limitation is the low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This unit is suited to the production of hay and small grain. The main limitation is slope. Sprinkler irrigation is the most suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Grazing when the soil is moist results in compaction of the surface layer, poor tilth, and excessive runoff. In some areas the supply of irrigation water is inadequate after mid-season.

The map unit is in capability subclasses IIIe, irrigated, and VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

168—Yarts sandy loam, 5 to 10 percent slopes. This very deep, well drained soil is on dissected alluvial fans near Cannonville and Henrieville. The soil formed in alluvium derived dominantly from sandstone. Slopes are linear and are medium in length. The present vegetation in most areas is mainly Wyoming big sagebrush and grasses. Elevation is 6,000 to 6,600 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 100 to 120 days.

Typically, the surface layer is light brown sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is light reddish brown fine sandy loam.

Included in this unit are about 10 percent Mikim clay loam that is dry and has slopes of 2 to 5 percent and 5 percent Henrieville sandy loam that has slopes of 5 to 10 percent.

Permeability of this Yarts soil is moderately rapid. Available water capacity is 6.5 to 8.0 inches. Water supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 65 percent grasses, 5 percent forbs, and 30 percent shrubs. Important plants are Indian ricegrass, galleta, winterfat, and fourwing saltbush. The suitability of the unit for rangeland seeding is poor. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Semidesert Sandy Loam (D35) range site.

169—Yenlo loam, 2 to 8 percent slopes. This very deep, well drained soil is on fan terraces and structural benches near Tropic and east of Henrieville. The soil formed in alluvium derived dominantly from sandstone, limestone, and shale. Slopes are concave and are medium in length. The present vegetation in most areas is mainly shrubs and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the average freeze-free period is 100 to 120 days.

Typically, the surface layer is yellowish brown loam about 2 inches thick. The upper 8 inches of the subsoil is brown clay loam, and the lower 13 inches is yellowish brown clay loam. The upper 19 inches of the substratum is light yellowish brown clay loam, and the lower part to a depth of 60 inches or more is very pale brown loam. In some areas the surface layer is as much as 3 percent organic matter.

Included in this unit are about 10 percent medium textured soils that have a gravelly or very gravelly substratum and 5 percent Mikim loam.

Permeability of the Yenlo soil is moderately slow. Available water capacity is 10 to 11 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 60 percent grasses, 5 percent forbs, and 35 percent shrubs. Important plants are Wyoming big sagebrush, Indian ricegrass, needleandthread, and blue grama. The suitability of the unit for rangeland seeding is fair. The main limitation is the low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (D35) range site.

170—Zillion very cobbly loam, 5 to 25 percent slopes. This very deep, well drained soil is on mountainsides near Dog Valley and south of Panguitch. The soil formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are slightly undulating and are medium in length. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 7,300 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is very dark grayish brown very cobbly loam about 5 inches thick. The next layer is dark brown very gravelly clay loam 4 inches thick. The subsoil is brown very gravelly clay loam 11 inches thick. The upper 10 inches of the substratum is grayish brown very cobbly loam, and the lower part to a depth of 60 inches or more is white and light brownish gray very gravelly sandy loam. A layer of lime accumulation is at a depth of about 22 inches.

Included in this unit are about 10 percent Dalcan very cobbly loam that is dry and 5 percent Harol very cobbly loam that has slopes of 15 to 40 percent.

Permeability of this Zillion soil is moderately slow. Available water capacity is 4 to 6 inches. Water supplying capacity is 5.5 to 8.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important plants are black sagebrush, Indian ricegrass, needleandthread, antelope bitterbrush, and mountain big sagebrush. The suitability of the unit for rangeland seeding is fair. The main limitations are the low available water capacity, the very cobbly surface layer, and slope.

This map unit is in capability subclass VIs, nonirrigated. It is in Upland Stony Loam (Black Sagebrush) range site.

171—Zinzer loam, 3 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans in the area extending from Panguitch to Hatch and near Widtsoe, in Johns Valley. The soil formed in alluvium derived dominantly from mixed sedimentary rock. Slopes are slightly undulating and long. The present vegetation in most areas is mainly black sagebrush and grasses. Elevation is 6,800 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 45 degrees F, and the freeze-free period is 70 to 100 days.

Typically, the surface layer is brown loam about 12 inches thick. The upper 24 inches of the underlying material is light yellowish brown clay loam, and the lower part to a depth of 60 inches or more is very pale brown sandy loam. A layer of lime accumulation is at a depth of about 12 inches.

Included in this unit are about 5 percent Bruman gravelly loam, 5 percent Venture cobbly loam, and 5 percent Andys loam.

Permeability of this Zinzer soil is moderately slow. Available water capacity is 8.0 to 10.5 inches. Water supplying capacity is 6.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on this unit is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Important plants are black sagebrush, Indian ricegrass, needleandthread, blue grama, and antelope bitterbrush. The suitability of the unit for rangeland seeding is fair. The main limitation is low precipitation. Undesirable plants can be controlled by plowing, burning, or spraying with chemicals. Drilling of seed is preferable and results in better stands of forage.

This map unit is in capability subclass VIe, nonirrigated. It is in Upland Loam (Black Sagebrush) range site.

172—Zyme very cobbly loam, 30 to 60 percent slopes. This shallow, well drained soil is on mountainsides in the Sheep Creek area and on Bulldog and Coal Benches. The soil formed in residuum derived dominantly from shale. Slopes are convex and short. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 100 days.

Typically, the surface layer is grayish brown very cobbly loam about 2 inches thick. The underlying material to a depth of 18 inches is light brownish gray clay over shale. Depth to shale is 10 to 20 inches.

Included in this unit are 10 percent soils that are similar to this Zyme soil but are 20 to 40 inches deep to shale and 5 percent Lazear gravelly sandy loam.

Permeability of this Zyme soil is slow. Available water capacity is 2 to 3 inches. Water supplying capacity is 2.5 to 3.5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as woodland, rangeland, and wildlife habitat.

The potential plant community on this unit is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are birchleaf mountainmahogany, Utah serviceberry, Indian ricegrass, Fremont mahonia, green Mormon tea, and Nevada bluegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the depth to shale and low available water capacity.

This map unit is in capability subclass VIIs, nonirrigated. It is in Upland Shallow Clay (Pinyon-Juniper) (D35) woodland site.

173—Zyme-Lazear-Rock outcrop complex, 8 to 60 percent slopes. This map unit is on mountainsides and mesas southeast of Henrieville, north and east of Tropic, in the Sheep Creek area, and on Bulldog Bench. Slopes are linear to convex and are short. The present vegetation in most areas is mainly pinyon, Utah juniper, shrubs, and grasses. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 49 degrees F, and the freeze-free period is 90 to 110 days.

This unit is 45 percent Zyme clay, 15 to 60 percent slopes; 30 percent Lazear gravelly sandy loam, 8 to 20 percent slopes; 15 percent Rock outcrop; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent soils that are similar to the Zyme soil but have shale at a depth of 20 to 40 inches and 5 percent soils that are similar to the Lazear soil but have bedrock at a depth of 20 to 40 inches.

The Zyme soil is shallow and well drained. It formed in residuum derived dominantly from shale. Typically, the surface layer is light olive gray clay about 2 inches thick. The underlying material to a depth of 11 inches is olive gray clay. Shale is at a depth of 11 inches. Depth to shale ranges from 10 to 20 inches.

Permeability of the Zyme soil is slow. Available water capacity is 1.5 to 2.0 inches. Water supplying capacity is 2.5 to 3.5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Lazear soil is shallow and well drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is pale brown gravelly sandy loam about 3 inches thick. The underlying material to a depth of 14 inches is light yellowish brown loam. Sandstone is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Lazear soil is moderate. Available water capacity is 2.0 to 2.5 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop consists of exposures of barren or nearly barren bedrock. It occurs mainly as nearly vertical cliffs and ledges.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Zyme soil is an overstory of pinyon and juniper and an understory of 30 percent grasses, 10 percent forbs, and 60 percent shrubs. Important understory plants are birchleaf mountainmahogany, Utah serviceberry, Indian ricegrass, and Nevada bluegrass.

The potential plant community on the Lazear soil is an overstory of pinyon and juniper and an understory of 45 percent grasses, 5 percent forbs, and 50 percent shrubs. Important understory plants are Bigelow sagebrush, galleta, and Indian ricegrass. The suitability of the unit for rangeland seeding is very poor. The main limitations are the low available water capacity and depth to bedrock.

This map unit is in capability subclass VIIs, nonirrigated. The Zyme soil is in Upland Shallow Clay (Pinyon-Juniper) (D35) woodland site, and the Lazear soil is in Upland Shallow Loam (Pinyon-Juniper) (D35) woodland site. Rock outcrop is not placed in a woodland site.

Prime Farmland

In this section, prime farmland is defined and discussed and the prime farmland soils in this survey area are listed.

Prime farmland is of major importance in providing the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, seed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. Adequate moisture and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils commonly get an adequate and dependable supply of moisture from precipitation or irrigation. Temperature and length of growing season are favorable, and level of acidity or alkalinity is acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland soils if the limitations are overcome by drainage, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information on the criteria for prime farmland soils can be obtained at the local office of the Soil Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

The following map units meet the soil requirements for prime farmland when irrigated. On some soils included in the list, measures should be used to overcome a hazard or limitation, such as flooding, wetness, or droughtiness. The location of each map unit is shown on the detailed soil maps at the back of this publication. Soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

2	Alldown clay loam, 1 to 2 percent slopes
3	Alldown clay loam, 2 to 5 percent slopes
19	Bruman loam, 2 to 5 percent slopes
25	Brycan very fine sandy loam, 1 to 6 percent slopes
40	Crestline fine sandy loam, 2 to 4 percent slopes
54	Greenhalgh silt loam, 1 to 2 percent slopes
64	Henrieville sandy loam, 1 to 2 percent slopes
65	Henrieville sandy loam, 2 to 5 percent slopes
72	Jodero loam, 1 to 2 percent slopes
81	Luhon loam, gravelly substratum, 1 to 2 percent slopes
82	Luhon loam, gravelly substratum, 2 to 5 percent slopes

89	Mikim loam, dry, 1 to 2 percent slopes
90	Mikim loam, 2 to 4 percent slopes
98	Notter loam, 1 to 4 percent slopes
104	Notter Variant loam, 1 to 4 percent slopes
113	Plite sandy loam, 2 to 8 percent slopes
127	Schauson loam, 2 to 4 percent slopes
141	Tebbs sandy loam, 2 to 5 percent slopes
142	Tebbs loam, 1 to 2 percent slopes
143	Tebbs loam, moist, 1 to 2 percent slopes
166	Yarts loam, 1 to 2 percent slopes
167	Yarts sandy loam, 2 to 5 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Howard Roper, soil conservationist, Soil Conservation Service, assisted in preparation of this section.

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants commonly grown are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 40,725 acres in this survey area is cropped. Of this, about 20,750 acres is used for hay, 600 acres for corn silage, 200 acres for orchard crops, and 12,200 acres for small grain. In addition, about 7,000 acres is used for meadow or pasture. No nonirrigated cropland was identified in the survey area.

The potential for increasing the acreage of cropland is limited by shortage of irrigation water and by climatic patterns; however, farm production could be increased by implementation of the latest cropland technology.

Use of a cropping system that keeps plant cover on the soil throughout the year reduces soil erosion and thus helps to maintain the productive capacity of the soils. Including legumes and grasses in the cropping system reduces erosion of sloping soils and helps to maintain soil tilth. Growing legumes can also add some nitrogen.

Minimizing tillage and leaving crop residue on the surface help to slow runoff. These practices are suited to all the soils in the survey area. Irrigated pastures consist of native, introduced, and improved grasses.

Suitable management practices on this unit are seeding of adapted species, proper irrigation water management, and practices designed to maintain soil fertility. The use of proper stocking rates and restricted grazing during wet periods helps to keep pastures in good condition.

Using and distributing irrigation water efficiently and maintaining soil fertility are the main management objectives on the irrigated soils in the survey area.

Proper irrigation grades, length of runs, distance between borders, and frequency and duration of irrigation water application should be considered. The irrigation method to be used depends on the type of crop grown, soil characteristics, slope, and the water supply. Irrigation water should be applied in amounts large enough to wet the root zone but small enough to minimize the leaching of plant nutrients. The Villy Family and Shupert soils are naturally wet, but they can be successfully drained for the production of hay, pasture, and grain crops. Only a small acreage in the survey area has been drained. The application of animal manure and commercial fertilizer is needed to maintain soil fertility. Legumes generally respond readily to phosphorus, and grasses respond readily to nitrogen. All additions of fertilizer should be based on the result of soil tests, cropping history, crop needs, and the desired level of crop yields. Fertilizer applications should be in agreement with the latest recommendations of the Cooperative Extension Service and Agricultural Experiment Station.

Soils used for crop production in the survey area have a dark-colored loam surface layer that is moderate in content of organic matter. These soils commonly have good tilth. Regular additions of crop residue, manure, and other organic material help to maintain and improve the tilth and water intake rate. Plowing in fall generally is beneficial to soil tilth and facilitates seedbed preparation. Oats and barley are the most commonly grown close-growing crops.

The soils of the Panguitch and Johns Valleys are in low positions on the landscape, where frost occurs frequently late in spring and early in fall. The air drainage in these areas is poor, and the climate is too severe for early vegetables, small fruit, and orchards. Latest information and suggestions for growing special crops can be obtained from the local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 4. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 4 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification *(5)* shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils generally are grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use. There are no class I soils in this survey area.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use. There are no class V soils in this survey area.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland and Woodland Understory Vegetation

Tom Simper, range conservationist, Soil Conservation Service, helped to prepare this section.

Rangeland is an important resource in this survey area. More than 330,000 acres in the area is used as rangeland, and 340,000 acres is used as grazeable woodland. Perennial grasses, forbs, and shrubs are the dominant vegetation. There is also a large acreage of woodland, particularly on national forest land.

The rangeland in this survey area is used mainly for grazing by cattle in spring, summer, and fall. The cattle are wintered on public land located south of the survey area. A few sheep are still grazed in the western part of the area. Water generally is obtained from the Sevier River, developed springs, streams, and wells. Livestock watering ponds, livestock trails, and pasture fencing are important practices for obtaining proper distribution of livestock over the range.

The native vegetation on the dry valley bottoms has been greatly depleted by continued excessive use. Open grasslands have become covered with sagebrush, rabbitbrush, and, in some areas, invading pinyon and juniper trees. The amounts of grazeable forage produced may be less than one-fourth of that originally produced. Productivity of the range can be improved by using proper grazing management practices, but in many areas reseeding of forage species is needed. The grazing management and reseeding practices are effective for specific kinds of soil and range sites.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on grazing sites are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

The major management concern on most of the rangeland is to control grazing so that the kinds and amounts of plants that make up the potential plant community are reestablished. Controlling undesirable shrubs is also important. If sound rangeland management based on soil survey information and range inventories is applied, the potential for increasing the productivity of the rangeland in the survey area is good. The majority of the areas that require control of undesirable shrubs should also be considered for reseeding.

Plants growing on the rangeland are affected not only by differences in the soils but also by differences in the average annual temperature and in the length of the growing season. These factors all influence the kinds and amounts of vegetation produced. The four types of climate in the survey area are those of the High Mountain, Mountain, Upland, and Semidesert climatic regimes. In addition, there are "Run-in" areas that span climatic regimes. These regimes are described in the following paragraphs.

High Mountain climatic regime.—The average annual precipitation in this regime ranges from 22 to 35 inches and occurs mostly as snow. The growing season is from about May 15 to September 20, or until a killing frost occurs in fall. High Mountain sites are on all exposures and slopes. The elevation ranges from about 8,200 to 10,800 feet. The average annual air temperature ranges from 34 to 38 degrees F.

The only range site in the High Mountain climatic regime is High Mountain Loam. Six woodland sites are in this climatic regime. These sites are High Mountain Loam (Aspen), High Mountain Loam (Engelmann Spruce), High Mountain Loam (Mixed Conifer), High Mountain Shallow Loam (Mixed Conifer), High Mountain Shallow Stony Loam (Mixed Conifer), and High Mountain Stony Loam (Mixed Conifer).

Mountain climatic regime.—The annual precipitation in this regime ranges from 16 to 22 inches. The precipitation in summer contributes about 45 to 50 percent of the annual total. Plant growth begins about May 1 and is stimulated again late in summer and early in fall as a result of short-duration thundershowers. Mountain range sites are on all exposures and slopes. The elevation ranges from 7,600 to 9,000 feet. The average annual air temperature is 36 to 42 degrees F.

Four range sites are in the Mountain climatic regime. These sites are the Mountain Shallow Loam, Mountain Stony Loam, Mountain Loam (Black Sagebrush), and Mountain Loam.

Three woodland sites occur in the Mountain climatic regime. These sites are Mountain Gravelly Loam (Ponderosa Pine), Mountain Sand (Ponderosa Pine), and Mountain Shallow Loam (Ponderosa Pine).

Upland climatic regime.—The annual precipitation ranges from 12 to 16 inches. About 55 percent of the annual precipitation occurs as rain in summer. The growing season begins about April 20 and ends about October 1. The rains late in summer and early in fall stimulate plant growth and make rangeland seeding feasible in August and early in September. Upland sites are on all exposures and slopes. The elevation ranges from 6,800 to 8,500 feet. The average annual temperature is 40 to 45 degrees F.

Within this survey is an area near Tropic, Utah, that is warmer than the rest of the survey area. The Upland climatic regime in this area is at an altitude of 6,300 to 7,200 feet. The average annual temperature is 46 to 49 degrees F.

Ten range sites are in the Upland climatic regime. These sites are the Upland Loam, Upland Loam (Black Sagebrush), Upland Stony Loam, Upland Gravelly Loam (Black Sagebrush), Upland Shallow Loam, Upland Shallow Hardpan, Upland Clay, Upland Clay (D35), Upland Loam (D35), and Upland Stony Loam (Black Sagebrush).

Eight woodland sites are in the Upland climatic regime. These sites are Upland Clay (Pinyon-Juniper), Upland Shallow Clay (Pinyon-Juniper), Upland Shallow Clay (Pinyon-Juniper) (D35), Upland Shallow Hardpan (Pinyon-Juniper), Upland Shallow Loam (Pinyon-Juniper), Upland Shallow Loam (Pinyon-Juniper) (D35), Upland Stony Loam (Pinyon-Juniper), and Upland Stony Loam (Pinyon-Juniper) (D35).

Semidesert climatic regime.—The annual precipitation ranges from 9 to 12 inches. About 55 percent of the annual precipitation occurs during the growing season. The growing season begins about April 15 and ends about October 1. The thunderstorms that occur late in summer and early in fall stimulate plant growth. Semidesert sites occur primarily on alluvial fans, alluvial plains, and rolling hills. The elevation ranges from 6,500 to 7,200 feet. The average annual temperature is 40 to 45 degrees F.

Within the survey area is an area near Tropic, Utah, that is warmer than the rest of the area. The Semidesert climatic regime in this area is at an altitude of 6,000 to 6,600 feet. The average annual temperature is 46 to 49 degrees F.

Fourteen range sites are in the Semidesert climatic regime. These sites are Semidesert Sandy Loam (Wyoming Big Sagebrush) (D28A), Semidesert Gravelly Loam (Wyoming Big Sagebrush) (D28A), Semidesert Loam (Basin Big Sagebrush), Semidesert Loam (Black Sagebrush), Semidesert Gravelly Loam (Wyoming Big Sagebrush), Semidesert Stony Loam, Semidesert Shallow Loam, Semidesert Silt Loam, Semidesert Sandy Loam (D35), Semidesert Loam (D35), Semidesert Shallow Clay (D35), Semidesert Sand (D35), Semidesert Loam (Wyoming Big Sagebrush), and Semidesert Gravelly Loam (Black Sagebrush).

Run-in areas.—There are several areas in this survey area that extend across climatic regime lines. These areas receive additional moisture as runoff from adjoining areas or an existing water table. The limitations of the soil, such as the content of rock fragments and the degree of salinity, effect the kind and amount of vegetation in these areas. Most of these areas are in the Semidesert and Upland climatic regimes.

Six range sites are in these "Run-in" areas. These sites are Loamy Bottom, Alkali Flat (D35), Alkali Fan (D35), Alkali Bottom, Wet Fresh Meadow, and Semiwet Fresh Meadow.

Table 5 shows, for each soil, the grazing site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as grazing sites or are suited to use as grazing sites are listed. An explanation of the column headings in table 5 follows.

A *grazing site* is a distinctive kind of land that produces a characteristic natural plant community that differs from natural plant communities on other grazing sites in kind, amount, and proportion of forage plants. The relationship between soils and vegetation was established during this survey; thus, grazing sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of forage plants. Soil reaction, salt content, and a seasonal water table are also important.

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees. The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Total production is the amount of vegetation that can be expected to grow annually on well managed land that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation—the grasses, grasslike plants, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. Because only key species are listed, the percentages do not necessarily total 100. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season. Generally, all of the vegetation produced is not used.

Grazing site management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present condition. Grazing site condition is determined by comparing the present plant community with the potential natural plant community on a particular grazing site. The more closely the existing community resembles the potential community, the better the grazing site condition. Grazing site condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in grazing site management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a grazing site condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

Lewis H. Jump, silviculturist, Dixie National Forest, helped to prepare this section.

Soil properties have a strong influence on the tree species present in this survey area, on their adaptation and growth, and on their management. Differences in texture and depth of the soil material affect the available water capacity and therefore influence tree growth. Slope and aspect also affect tree growth and the way woodland is managed.

The commercial timber species in this survey area are ponderosa pine, Douglas-fir, white fir, Colorado blue spruce, Engelmann spruce, subalpine fir, limber pine, and aspen. Ponderosa pine is the most important commercially used species. Aspen has recently been recognized and accepted by local timber industries as a commercial species that can be used on an intermittent basis for producing excelsior and paneling.

In the following paragraphs are discussed the forest types in the area, timber stand conditions, and plantation seedling mortality.

Forest types.—Occurrence and distribution of timber species are highly variable on the Paunsaugunt and Sevier Plateaus, which are highly dissected and range in elevation from 6,000 to 10,000 feet. Pinyon-juniper stands commonly are at lower elevations, generally below 7,500 feet, but they are at higher elevations on south and west aspects. Ponderosa pine commonly is at elevations between 7,500 and 8,500 feet, but it is at lower elevations on north aspects and draw bottoms and at higher elevations on south and west aspects. Ponderosa pine commonly is mixed with pinyon and juniper at lower elevations and with Douglas fir and white fir at higher elevations.

Douglas fir and white fir most commonly are present at elevations between 8,500 and 9,500 feet. Because Douglas fir is suited to a wider range of growing conditions, it occurs with ponderosa pine in the moister areas below an altitude of 8,500 feet and occasionally with subalpine fir and Engelmann spruce in the warmer and drier areas above an altitude of 9,500 feet. White fir, however, is rarely present with subalpine fir and Engelmann spruce. The Engelmann spruce-subalpine fir forest type occupies the smallest area of commercial timber on the Paunsaugunt Plateau, commonly at elevations above 9,500 feet. The largest area of spruce-fir is in the vicinity of Jones Corral and Mount Dutton Peak, on the north end of Sevier Plateau. Only small, scattered stands are present at the higher elevations (more than 9,500 feet) near the south end of the survey area.

Aspen grows in scattered stands throughout the survey area, mostly in association with the mixed conifer and spruce-fir forest types. Much of the aspen is remnant, as fire control has allowed ecological succession to progress toward the climax stage. Colorado blue spruce is common on wet bottoms and moist north aspects from the ponderosa pine type through the mixed conifer type to about 9,000 feet. Limber pine is present on shallow soils and in the drier areas at the higher elevations of the ponderosa pine type and is scattered throughout the mixed conifer type on poorer sites. Bristlecone pine is present on the more barren ridges and slopes. It commonly is associated with the shallow Vanet and Paunsaugunt soils.

Timber stand conditions.—Site index is used to show the potential productivity or growth rate of timbered soils. For ponderosa pine, fir, and aspen, the site index is a numerical expression of average height of the dominant and codominant trees in the stand at 100 years of age, and for Engelmann spruce at 50 years of age. This factor is obtained by comparing the age and height of the dominant and codominant trees.

Where slopes are less than 40 percent, stands of commercial timber accessible for tractor logging have been harvested at least once. Much of the ponderosa pine type within the survey area is on shallow, dry soils such as those of the Vanet series, on which tree growth and productivity are relatively low (the site index is 40 to 75). The Syrett soils are somewhat more productive (the site index is 60 to 75) and are on benches and mesa side slopes.

The ponderosa pine forest type on the Pausaugunt Plateau is probably most influenced by the rain shadow effect of the Markagunt Plateau to the west and the Tushar Mountains to the northwest. The Syrett soils could be more productive if more moisture were available during the growing season. As a result of this rain shadow effect, a history of fire, and a periodically irregular seed crop, more ponderosa pine stands in the survey area are less even-aged than previously thought. While some stands apparently are not even-aged, others are two-storied or, more commonly, mosaics of even-aged groups.

Most of the older harvests of the ponderosa pine forest type involved selection of higher risk trees and sanitation-salvage. Several patch and stand clearcuts were done in the 1960's. Successful regeneration of these clearcuts by planting bare-root seedlings has been marginal, especially on the shallower Vanet soils. While initial survival was good in most areas, growth has been poor and many surviving trees are now dying from lack of sufficient moisture. The Rock Mountain tree planter was used in most of these clearcut areas without prior ripping or subsoiling. As a result, the colter rode on top of the fractured limestone at a depth of 6 to 12 inches, causing planted trees to have an *L*-shaped root configuration.

Many of these clearcut areas now support mostly perennial grasses and woody brush. An intensive and expensive site preparation program would be required to reestablish trees in these areas. Tree selection and shelterwood harvesting are now being applied in the ponderosa pine stands to provide site moderation during the regeneration period. Use of containerized seedlings and individual seedling protection devices currently are being evaluated for effectiveness on the shallower and drier sites.

Dwarf mistletoe and porcupines have been the most damaging agents to ponderosa pine. Most porcupines were eradicated during the 1960's, but there are still many damaged and unmerchantable trees. These trees are being removed systematically as a part of commercial thinnings and timber stand improvement projects. Areas infected by mistletoe have been identified and are being treated by removing infected trees during timber harvest and as a part of stand improvement projects. Mountain pine beetle attacks scattered clumps and individual mature ponderosa pine but most stands are of relatively low density through past harvesting and thinning, so a mountain pine beetle epidemic is not a current threat. Most stands of saplings and poles have been precommercially thinned to obtain rapid diameter growth to a commercial size of 10 to 12 inches.

The mixed conifer forest type (Douglas fir, white fir, ponderosa pine, and aspen) covers the southern two-thirds of the Paunsaugunt Plateau. Douglas fir is the most economically important species. Most harvesting in this area has been by clearcutting in blocks of as much as 80 acres and on slopes of as much as about 40 percent. Areas not accessible for tractor logging remain uncut. Most areas where slopes are less than 40 percent are potentially highly productive (the site index is 65 to 85). Nearly all of the Douglas fir has been heavily infected with dwarf mistletoe, which prompted the aggressive clearcutting program of the 1960's.

Regeneration of many clearcut areas by planting bare root seedlings has been marginally successful at best. Not planting soon enough after harvest; improper or inadequate site preparation; inappropriate seed source or species selection, or both (ponderosa pine was planted on many sites above 8,500 feet); and damage by pocket gophers and livestock have all contributed to plantation failures and poor stocking in the clearcut areas. Most clearcut areas now support heavy growth of combinations of woody brush (ribes and snowberry), aspen, and perennial grasses. As with the pine forest type, very intensive and expensive site preparation and removal of plant competition is required to return these areas (2,300 acres) to full production.

Some stands of mixed conifers in areas where slopes are less than 40 percent have been partially cut; however, most of the best trees have been harvested, leaving undesirable residual stands of white fir, limber pine, and aspen. These areas also need to undergo regeneration to return to full productivity. Nearly 30,000 acres of mixed conifers grow in areas where slopes are more than 40 percent and are largely in a virgin condition. Many of these stands exhibit negative net growth because of old age and growth losses and as a result of mortality from the Douglas fir dwarf mistletoe and the white fir needle miner. Even limber pine suffers from infestation by needle miner and mistletoe.

The Dixie National Forest is currently developing a timber sale program for this area to encourage local timber purchasers to begin using cable logging systems for harvesting trees on the steeper slopes. The combination of poor market conditions, low tree quality, and low net volumes per acre may hamper this effort.

The only significant area of Engelmann spruce in the survey area is on the Behanin soils that are at the highest elevations (more than 9,500 feet) on the Sevier Plateau, near Mount Dutton Peak. Only one major timber sale has been made in this area because of the long hauling distance to the Panguitch Sawmill and poor market conditions. Most of this sale consists of patch clearcuts. Survival and growth of Engelmann spruce seedlings planted on these clearcuts have been very good.

Stands of spruce, fir, and aspen, especially those near Jones Corral, have become very dense, which has considerably slowed tree growth. These stands offer excellent potential for timber harvest and management if access is improved and market conditions become more favorable.

Bryce Canyon National Park occupies roughly the eastern one-third of the Paunsaugunt Plateau. The topography consists of a long, narrow ridge that runs from north to south and has sharply breaking slopes of weathered Wasatch Limestone. The ridgetop supports dense stands of ponderosa pine and mixed conifers. The steeper breaks are mostly barren of vegetation. The gravelly canyon bottoms below the breaks support stringers of ponderosa pine. Mixed stands of conifers and, to a lesser extent, ponderosa pine on the ridgetop are heavily infested with dwarf mistletoe, limb and broom rusts, needle miners, and several species of bark beetles. The National Park Service policy of not harvesting timber in order to maintain wilderness conditions while controlling natural fires has led to heavy accumulations of dead trees, both standing and down. Insect and disease populations are at an epidemic level, and timber mortality has been very high in recent years. Ponderosa pine stands on the lower slopes and canyon bottoms are relatively healthy but are of moderate to low productivity.

Plantation seedling mortality.—Some soils are more suitable for the planting of seedling trees, especially ponderosa pine, than are other soils. The ratings assigned by percentage of mortality are low (less than 25 percent), moderate (25 to 50 percent), and high (more than 50 percent). A rating of *low* can be expected on soils that have reaction of 7.0 or less in the surface layer, are moderately deep to deep, have moderate to high water supplying capacity for tree growth, and have warm summer soil temperatures. A rating of *high* can be expected on soils that have reaction of more than 7.0 in the surface layer, are shallow, and have low water-supplying capacity for tree growth. Soils that have a fine textured subsoil and cool summer temperatures also have high seedling mortality.

Recreation

This survey area includes popular hunting areas for big game animals such as deer, elk, and antelope. Popular game birds in the area are sage grouse, blue grouse, and turkey. Pine Hens, Deep, Blue Fly, Badger, Skunk, Blubber, and Kanab Creeks and East Fork Sevier River all support sport fisheries; however, East Fork Sevier River is the only stream that is used on a regular basis for recreation.

Tropic Reservoir is the only major body of water in the area. It is used for fishing, swimming, and boating. King Creek Campground is to the west of the reservoir. The campground received more than 15,000 recreation visits during 1983.

Bryce Canyon National Park, Red Canyon, and King Creek are the only public campgrounds in the survey area. Red Canyon and King Creek are on national forest land and are within 10 miles of Bryce Canyon National Park. The park influences the use of the campgrounds in that it draws people into the area from all over the world. Campgrounds in the park generally are filled early, and the overflow is directed to the national forest areas.

Bryce Canyon National Park is a major recreation and scenic area in the survey area. The park usually attracts more than 500,000 visitors annually *(7)*. Several tourist facilities outside the park offer lodging, meals, groceries, and gasoline. Complete tourist facilities are also available inside the park.

The soils of the survey area are rated in table 6 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 6, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties generally are favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 6 can be supplemented by other information in this survey; for example, interpretations for dwellings without basements and for local roads and streets in table 7 and interpretations for septic tank absorption fields in table 8.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils are gently sloping and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

Robert Sennett, biologist, Soil Conservation Service, helped to prepare this section.

Most of the soils in the survey area support vegetation that is used by wildlife to some extent. Most species of wildlife are not confined to areas of a particular soil or group of soils. The presence of wildlife in a given area depends on the availability of food, water, and cover and on their relationship to each other. The suitability of the soils for providing these elements and how the soils are used determine the relative abundance of wildlife species in the area.

The mountainous parts of the survey area provide summer habitat for mule deer and elk. Other important species include coyote, blue grouse, snowshoe hare, and occasional black bear. The upland parts of the survey area provide habitat for these species as well as for sage grouse, badger, bobcat, antelope, and ground squirrel. Wetlands and adjacent areas provide a diverse habitat. A variety of wildlife including mammals, reptiles, amphibians, songbirds, raptors, and waterfowl use this habitat. Some typical species are red fox, skunk, cottontail, rattlesnake, salamanders, hawks, ducks, and geese.

Semidesert areas provide habitat for several unique species including chukar partridge, rattlesnakes, scorpions, and kangaroo rat.

Natural streams and lakes in the survey area provide fishing and recreation for local residents and tourists. Some streams provide year-round fishing. A limited amount of fishing is provided by small reservoirs. Important fish species include rainbow trout, cutthroat trout, and other game fish. These water bodies and associated vegetation provide habitat important for beaver, muskrat, and mink.

The endangered peregrine falcon and bald eagle are present in the survey area. The eagle is more prevalent in winter. The falcon is present in summer. The lowland areas that are associated with agriculture provide habitat for the endangered Utah prairie dog. The endangered Rydberg milkvetch is present in a mountainous area of the Dixie National Forest. There are no known threatened or endangered fish species in the area.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building Site Development, Sanitary Facilities, Construction Materials, and Water Management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps and soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 7 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, and local roads and streets. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for dwellings with basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary Facilities

Table 8 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 8 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 8 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage because of rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. The waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site.

The trench landfill must be able to bear heavy vehicular traffic. It involves a risk of ground water pollution. Ease of excavation and revegetation needs to e considered.

The ratings in table 8 are based on soil properties, ite features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a igh water table, slope, and flooding affect both types of andfill. Texture, stones and boulders, highly organic ayers, soil reaction, and content of salts and sodium ffect trench type landfills. Unless otherwise stated, the atings apply only to that part of the soil within a depth f about 6 feet. For deeper trenches, a limitation rated light or moderate may not be valid. Onsite vestigation is needed.

Daily cover for landfill is the soil material that is used o cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 8 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 9, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the taxonomic unit descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a *probable* source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an *improbable* source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 10 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect irrigation and terraces and diversions.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 11 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 to 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each taxonomic unit under "Taxonomic Units and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials *(1)* and the Unified soil classification system *(2, 3)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification; for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard

Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 12 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each taxonomic unit under "Taxonomic Units and Their Morphology."

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to absorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $\frac{1}{3}$ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion.

Erosion factor T is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the amount of stable aggregates 0.84 millimeters in size. These are represented idealistically by USDA textural classes. Soils containing rock fragments can occur in any group.

1. Sand, fine sand, and very fine sand. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish on them.

2. Loamy sand, loamy fine sand, and loamy very fine sand. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loam, coarse sandy loam, fine sandy loam, and very fine sandy loam. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clay, silty clay, clay loam, and silty clay loam that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loam and sandy clay that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loam. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loam that is less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Soil and Water Features

Table 13 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sand or gravelly sand. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay that has high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered to be flooding. Standing water in swamps and marshes or in closed depressional areas is considered to be ponding.

Table 13 gives the frequency of flooding and the time of year when flooding is most likely to occur.

Frequency and probable period of flooding are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (chance of flooding in any year is 0 to 5 percent); *occasional* that it occurs infrequently under normal weather conditions (chance of flooding in any year is 5 to 50 percent); and *frequent* that it occurs often under normal weather conditions (chance of flooding in any year is more than 50 percent).

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic flood. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(6)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 14 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Boroll (*Bor*, meaning cool, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Cryoborolls (*Cry*, meaning cold, plus *boroll*, the suborder of the Mollisols that have a cold temperature regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Argic Pachic* identifies the subgroup within the great group. An example is Argic Pachic Cryoborolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, montmorillonitic Argic Pachic Cryoborolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Taxonomic Units and Their Morphology

In this section, each taxonomic unit recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each unit. A pedon, a small three-dimensional area of soil, that is typical of the unit in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (4)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (6)*. Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the unit.

The map units of each taxonomic unit are described in the section "Detailed Soil Map Units."

Ahlstrom Series

The Ahlstrom series consists of very deep, well drained soils on low terraces and in valleys. These soils formed in mixed alluvium derived from limestone, shale, and sandstone. Slopes are 1 to 3 percent. Elevation is 7,600 to 8,400 feet. Average annual precipitation is 14 to 18 inches, and average annual temperature is 40 to 45 degrees F.

These soils are fine, montmorillonitic, frigid Typic Ustochrepts.

Typical pedon of an Ahlstrom silt loam in an area of Ahlstrom-Osote complex, 1 to 15 percent slopes, in Daves Hollow; in the NE¼ of sec. 25, T. 36 S., R. 4 W.

A1—0 to 7 inches; brown (7.5YR 5/4) silt loam, dark brown (7.5YR 3/4) moist and crushed; moderate fine platy structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots and common fine and medium roots; many fine and very fine pores and common medium pores; slightly calcareous; mildly alkaline (pH 7.4); abrupt smooth boundary.

Bw1—7 to 10 inches; brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 3/4) moist and crushed; moderate fine and medium prismatic structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; few very fine and medium roots; common fine and few very fine pores; strongly calcareous; mildly alkaline (pH 7.4); clear smooth boundary.

Bw2—10 to 14 inches; brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 4/4) moist and crushed; moderate medium prismatic structure parting to moderate fine and medium angular blocky; hard, firm, sticky and plastic; common fine roots and few very fine and medium roots; few fine pores; strongly calcareous; mildly alkaline (pH 7.5); abrupt smooth boundary.

Bk1—14 to 20 inches; reddish yellow (7.5YR 6/6) silty clay loam, reddish brown (5YR 4/4) moist and crushed; weak medium angular blocky structure parting to moderate fine angular blocky; hard, firm, sticky and plastic; few fine and very fine roots; many very fine pores; very strongly calcareous; mildly alkaline (pH 7.5); clear smooth boundary.

Bk2—20 to 60 inches; reddish yellow (5YR 6/6) silty clay, reddish yellow (5YR 6/8) moist and crushed; moderate very coarse angular blocky structure parting to moderate medium and fine angular blocky; very hard, very firm, sticky and plastic; few very fine and medium roots; many very fine pores; few thin clay films in pores; very strongly calcareous; mildly alkaline (pH 7.8).

Depth to bedrock is estimated to be 6 to 20 feet.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4.

The Bw horizon has hue of 5YR or 7.5YR, value of 5 to 8 when dry and 3 to 6 when moist, and chroma of 3 to 6. It is loam, silt loam, silty clay loam, or silty clay.

The Bk horizon has hue of 5YR, 7.5YR, or 10YR, value of 6 to 8 when dry and 4 to 6 when moist, and chroma of 4 to 8. It is stratified silt loam, silty clay loam, gravelly loam, and silty clay.

Alldown Series

The Alldown series consists of very deep, well drained soils on dissected alluvial fans and valley plains. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock and some sedimentary rock. Slopes are 1 to 5 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Alldown clay loam, 1 to 2 percent slopes, in the SW¼ of sec. 16, T. 34 S., R. 5 W.

A1—0 to 10 inches; pinkish gray (7.5YR 6/2) clay loam, brown (7.5YR 4/3) moist; moderate medium granular structure; very hard, firm, sticky and plastic; many fine and medium roots and few coarse roots; common fine and medium pores; strongly calcareous; moderately alkaline (pH 8.0); clear smooth boundary.

Bw—10 to 28 inches; light gray (10YR 7/2) clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; many fine and medium roots; common very fine and fine pores; strongly calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

C1—28 to 48 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; hard, friable, sticky and plastic; common fine roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

C2—48 to 54 inches; light gray (10YR 7/2) clay loam, brown (10YR 5/3) moist; massive; very hard, firm, sticky and plastic; few fine roots; few very fine and fine pores; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

C3—54 to 60 inches; light gray (10YR 7/2) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly hard and slightly plastic; few fine roots; few very fine and fine pores; strongly calcareous; moderately alkaline (pH 8.0).

Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 2 or 3. It is loam or clay loam. It is moderately calcareous or strongly calcareous.

The B and C horizons have hue of 7.5YR or 10YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 2 or 3. They are silt loam, loam, sandy clay loam, clay loam, sandy loam, or very fine sandy loam. Clay content averages 18 to 35 percent. The horizons are moderately calcareous or strongly calcareous and are moderately alkaline to very strongly alkaline.

Andys Series

The Andys series consists of very deep, well drained soils on dissected alluvial fans, mountainsides, and plateaus. These soils formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are 2 to 25 percent. Elevation is 6,800 to 7,500 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are coarse-loamy, mixed Aridic Calciborolls.

Typical pedon of Andys loam, about 3 miles southeast of Panguitch, in the SW¼ of sec. 36, T. 34 S., R. 5 W.

A1—0 to 8 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; common very fine pores; 5 percent pebbles; moderately calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

Bk1—8 to 30 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; massive; friable, slightly sticky and slightly plastic; few fine roots; few fine and medium pores; 10 percent pebbles; strongly calcareous; slightly cemented to strongly cemented; lime in veins and filaments; strongly alkaline (pH 8.6); gradual wavy boundary.

Bk2—30 to 47 inches; white (10YR 8/2) gravelly loam, pale brown (10YR 6/3) moist; massive; very hard, friable, slightly sticky and slightly plastic; few fine roots; few fine pores; 10 percent pebbles and 5 percent cobbles; strongly calcareous; lime in veins and filaments; moderately alkaline (pH 8.2); gradual wavy boundary.

C—47 to 60 inches; light gray (10YR 7/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; single grain; slightly plastic; 20 percent pebbles and 10 percent cobbles; strongly calcareous; moderately alkaline (pH 8.4).

The mollic epipedon is 7 to 8 inches thick. Bedrock is at a depth of 60 inches or more. The particle size control section is 0 to 25 percent rock fragments. Secondary carbonates are at a depth of 7 to 8 inches.

The A horizon has chroma of 2 or 3. It is loam or very cobbly loam. It is slightly calcareous or moderately calcareous. Rock fragment content is 5 to 45 percent.

The Bk and C horizons have hue of 7.5YR or 10YR, value of 7 or 8 when dry and 5 or 6 when moist, and chroma of 2 to 4. They are loam, gravelly loam, or gravelly sandy loam. Clay content is 8 to 18 percent. Rock fragment content is 8 to 30 percent. Reaction is moderately alkaline or strongly alkaline.

Baldfield Series

The Baldfield series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from shale. Slopes are 2 to 8 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine, montmorillonitic (calcareous), mesic Ustertic Torriorthents.

Typical pedon of Baldfield clay, 2 to 8 percent slopes, eroded, about 2.5 miles north of Henrieville, about 2,640 feet south and 1,320 feet west of the northeast corner of sec. 11, T. 37 S., R. 2 W.

A1—0 to 2 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate very fine granular structure; hard, very firm, sticky and very plastic; cracks 1 to 3 centimeters wide extend through the horizon; few coarse roots; few fine pores; strongly calcareous; strongly alkaline (pH 8.6); abrupt smooth boundary.

C1—2 to 4 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate very thin platy structure; very hard, very firm, sticky and very plastic; cracks 2 centimeters wide extend through the horizon; few coarse roots; few fine pores; strongly calcareous; strongly alkaline (pH 8.8); abrupt smooth boundary.

C2—4 to 15 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure; very hard, very firm, sticky and very plastic; cracks 1 to 2 centimeters wide extend through the horizon; few coarse and medium roots; few fine pores; strongly calcareous; strongly alkaline (pH 8.8); gradual wavy boundary.

C3—15 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure; extremely hard, very firm, sticky and very plastic; few fine and medium roots; few fine and medium pores; veins of lime and gypsum; strongly calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more.

The A horizon has value of 5 or 6 when dry and 4 or 5 when moist. Reaction is moderately alkaline or strongly alkaline.

The C horizon has hue of 2.5Y or 5Y, and it has value of 5 or 6 when dry and 4 or 5 when moist. Clay content is 35 to 50 percent. Reaction is moderately alkaline or strongly alkaline.

Barx Series

The Barx series consists of very deep, well drained soils on dissected alluvial fans and alluvial terraces. These soils formed in alluvial and eolian material derived dominantly from sandstone and shale. Slopes are 2 to 10 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine-loamy, mixed, mesic Ustollic Haplargids.

Typical pedon of Barx fine sandy loam, 2 to 10 percent slopes, about 5.5 miles south-southwest of Escalante, in the SW¼SE¼ of sec. 10, T. 36 S., R. 3 E.

A1—0 to 5 inches; brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; weak coarse platy structure parting to weak fine granular; soft, friable; few medium roots and many fine and very fine roots; few medium pores and common fine and very fine pores; mildly alkaline (pH 7.8); clear smooth boundary.

Bt—5 to 12 inches; yellowish red (5YR 5/6) sandy clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and slightly plastic; few medium roots and common fine and very fine roots; few medium pores and common fine and very fine pores; common moderately thick clay films on faces of peds and lining pores; moderately alkaline (pH 7.9); clear wavy boundary.

Bw—12 to 31 inches; reddish yellow (5YR 6/6) sandy loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common medium, fine, and very fine roots; common medium pores and many fine and very fine pores; moderately alkaline (pH 8.1); clear smooth boundary.

Bk—31 to 48 inches; light reddish brown (5YR 6/4) sandy loam, reddish brown (5YR 5/4) moist; massive; slightly hard, friable; few medium, fine, and very fine roots; few medium pores and common fine and very fine pores; moderately calcareous; lime is disseminated; moderately alkaline (pH 8.4); clear smooth boundary.

C—48 to 60 inches; light reddish brown (5YR 6/4) sandy loam, reddish brown (5YR 5/4) moist; massive; soft, friable; few fine and very fine roots; common fine and very fine pores; slightly calcareous; lime is disseminated; moderately alkaline (pH 8.4).

Bedrock is at a depth of 60 inches or more. The solum is 20 to 33 inches thick. The A1 horizon has hue of 7.5YR or 5YR. The Bt horizon is 22 to 35 percent clay. The Bk and C horizons are fine sandy loam or sandy loam.

Bayfield Series

The Bayfield series consists of very deep, well drained soils on fan terraces and valley plains. These soils formed in alluvium derived dominantly from shale. Slopes are 2 to 8 percent. Elevation is 6,300 to 7,200 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine, mixed (calcareous), mesic Ustertic Torriorthents.

Typical pedon of Bayfield clay, 2 to 8 percent slopes, about 3 miles south of Tropic, in the NE¼ of sec. 14, T. 37 S., R. 3 W.

A1—0 to 3 inches; light brownish gray (10YR 6/2) clay, grayish brown (2.5Y 5/2) moist; weak fine granular structure; slightly hard, firm, sticky and plastic; few fine roots; few fine interstitial pores; strongly calcareous; strongly alkaline (pH 8.4); abrupt smooth boundary.

C1—3 to 15 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; massive; very hard, firm, sticky and plastic; few fine, medium, and coarse roots; common fine pores; strongly calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

C2—15 to 41 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; strong coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few fine roots; common fine pores; strongly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

C3—41 to 60 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; few fine roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.2).

Bedrock is at a depth of 60 inches or more.

The C horizon has value of 5 or 6 when dry and 4 or 5 when moist, and it has chroma of 2 or 3. It is moderately calcareous or strongly calcareous.

Befar Series

The Befar series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from shale. Slopes are 4 to 8 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine, montmorillonitic (calcareous), mesic Ustertic Torriorthents.

Typical pedon of Befar clay, 4 to 8 percent slopes, about 4 miles east of Tropic, in the SE¼ of sec. 28, T. 36 S., R. 2 W.

A1—0 to 2 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate very fine granular structure, hard, firm, sticky and plastic; few fine roots; few fine pores; moderately calcareous; moderately alkaline (pH 8.2); abrupt smooth boundary.

C1—2 to 18 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, sticky and plastic; few fine, medium, and coarse roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.2); clear smooth boundary.

C2—18 to 26 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, sticky and plastic; few fine and very fine roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.2); gradual wavy boundary.

C3—26 to 48 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, sticky and plastic; few very fine roots; few very fine and medium pores; veins of lime and gypsum; strongly calcareous; moderately alkaline (pH 8.2); gradual wavy boundary.

C4—48 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, sticky and plastic; few fine roots; few fine pores; veins of lime and gypsum; strongly calcareous; moderately alkaline (pH 8.2).

Bedrock is at a depth of 60 inches or more.

The A horizon has value of 5 or 6 when dry. It is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline. Electrical conductivity of the saturation extract is 4 to 8 millimhos per cubic centimeter.

The C horizon has value of 5 or 6 when dry and 4 or 5 when moist. It is clay or silty clay. Clay content is 40 to 50 percent. It is moderately calcareous or very strongly calcareous. Reaction is moderately alkaline or strongly alkaline. Electrical conductivity of the saturation extract is 8 to 16 millimhos per cubic centimeter.

Behanin Series

The Behanin series consists of very deep, well drained soils on north-facing slopes of ridges, hills, and mountains. These soils formed in colluvium and residuum derived from intermediate volcanic rock. Slopes are 30 to 70 percent. Elevation is 8,200 to 10,500 feet. Average annual precipitation is 18 to 30 inches, and average annual temperature is 34 to 40 degrees F.

These soils are loamy-skeletal, mixed Pachic Cryoborolls.

Typical pedon of Behanin loam, 30 to 70 percent slopes, on Cottonwood Pass Road, in the SW¼ of sec. 14, T. 32 S., R. 4 W.

O1—1 inch to 0; undecomposed and partly decomposed needles and twigs.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak very thin platy structure parting to weak moderate fine granular; slightly hard, very friable, nonsticky and nonplastic; few medium and common fine roots; few very fine pores; 5 percent subangular pebbles; medium acid (pH 6.0); clear smooth boundary.

A2—2 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine and very fine granular; slightly hard, very friable, nonsticky and nonplastic; few coarse roots, common medium roots, and many fine and very fine roots; few very fine pores; 5 percent subangular pebbles; medium acid (pH 6.0); clear wavy boundary.

A3—8 to 17 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak very fine granular; slightly hard, friable, slightly sticky and slightly plastic; few coarse and medium roots and common fine and very fine roots; common very fine pores; 10 percent subangular pebbles; medium acid (pH 6.0); abrupt wavy boundary.

Bw1—17 to 29 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common medium and coarse roots and few fine and very fine roots; few very fine pores; 40 percent subangular cobbles; medium acid (pH 6.0); gradual wavy boundary.

Bw2—29 to 44 inches; dark brown (10YR 4/3) very cobbly loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky and slightly plastic; common coarse and medium roots and few fine and very fine roots; few fine pores; 50 percent subangular cobbles; medium acid (pH 6.0); gradual wavy boundary.

C—44 to 60 inches; dark brown (10YR 4/3) extremely cobbly sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few medium roots; 85 percent subangular cobbles and 10 percent stones; medium acid (pH 6.0).

The mollic epipedon is 16 to 24 inches thick. The particle size control section averages 18 to 25 percent clay and 35 to 60 percent rock fragments. Depth to fractured bedrock is 5 to 8 feet.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 or 3 when moist, and chroma of 2 or 3.

The B horizon has value of 4 to 6 when dry, and it has chroma of 2 or 3. It is cobbly loam, extremely cobbly loam, or very cobbly loam.

The C horizon has value of 4 to 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3.

Blanchard Family

The Blanchard Family consists of deep, excessively drained soils on long, narrow ridges. These soils formed in residuum and eolian deposits derived from sandstone. Slopes are 30 to 70 percent. Elevation is 7,600 to 8,200 feet. Average annual precipitation is 15 to 18 inches, and average annual temperature is 41 to 43 degrees F.

These soils are mixed, frigid Typic Ustipsamments.

Reference pedon of Blanchard Family sand, 30 to 70 percent slopes, about 1 mile southeast of intersection of Garfield-Kane County line and Bryce Canyon National Park Highway, in the SW¼ of sec. 5, T. 38 S., R. 4 W.

C1—0 to 5 inches; light gray (2.5Y 7/2) sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; few fine roots; few fine interstitial pores; neutral (pH 6.8); clear smooth boundary.

C2—5 to 14 inches; light gray (2.5Y 7/2) sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; many fine roots and few medium and coarse roots; few fine interstitial pores; neutral (pH 6.7); gradual wavy boundary.

C3—14 to 55 inches; very pale brown (10YR 7/3) sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few fine, medium, and coarse roots; few fine interstitial pores; neutral (pH 6.7); clear smooth boundary.

R—55 inches; sandstone.

Bedrock is at a depth of 40 to 60 inches.

The C horizon has hue of 10YR or 2.5Y. It is sand or fine sand.

Borollic Natrargids

The Borollic Natrargids consist of very deep, moderately well drained soils on flood plains and fan terraces. These soils formed in alluvium derived from mixed sedimentary and igneous rock. Slopes are 0 to 1 percent. Elevation is 6,500 to 7,200 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are Borollic Natrargids.

Reference pedon of Borollic Natrargids, 0 to 1 percent slopes, in Johns Valley, about 400 feet west and 2,400 feet north of the northeast corner of sec. 2, T. 33 S., R. 2 W.

E—0 to 2 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium platy structure; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; many very fine and fine vesicular pores; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); abrupt smooth boundary.

Btn1—2 to 8 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; strong medium prismatic structure parting to moderate fine subangular blocky; extremely hard, firm, sticky and plastic; few fine, medium, and coarse roots; common very fine and fine pores; common moderately thick clay films on faces of peds and in pores; strongly calcareous; carbonates are disseminated; very strongly alkaline (pH 9.6); clear wavy boundary.

Btn2—8 to 15 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; moderate medium prismatic structure parting to moderate fine angular blocky; extremely hard, firm, sticky and plastic; few fine, medium, and coarse roots; common very fine and fine pores; common moderately thick clay films on faces of peds and in pores; strongly calcareous; carbonates are disseminated; very strongly alkaline (pH 9.6); clear smooth boundary.

Bw—15 to 35 inches; pink (7.5YR 7/4) clay loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; common very fine and fine pores; strongly calcareous; carbonates are disseminated; very strongly alkaline (pH 9.6); clear smooth boundary.

C1—35 to 48 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; hard, friable, sticky and plastic; few very fine roots; common very fine pores; strongly calcareous; carbonates are disseminated; very strongly alkaline (pH 9.6); clear wavy boundary.

C2—48 to 60 inches; very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; massive; hard, firm, sticky and plastic; few very fine roots; few very fine pores; moderately calcareous; carbonates are disseminated; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more.

The Btn horizon has value of 5 or 6 when dry and 4 or 5 when moist. Clay content is 28 to 40 percent.

The C horizon has hue of 7.5YR or 10YR, and it has chroma of 3 or 4. It is loam or clay loam. Clay content is 25 to 35 percent. It is moderately calcareous or strongly calcareous. Reaction is strongly alkaline or very strongly alkaline.

Broncho Series

The Broncho series consists of very deep, somewhat excessively drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 2 to 5 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 8 to 11 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are sandy-skeletal, mixed, mesic Xerollic Camborthids.

Typical pedon of Broncho very gravelly sandy loam, 2 to 5 percent slopes, about 3 miles southeast of Circleville, about 2,000 feet north and 2,500 feet east of the southwest corner of sec. 13, T. 31 S., R. 4 W.

A1—0 to 6 inches; brown (10YR 5/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine pores; 30 percent pebbles, 10 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.8); gradual smooth boundary.

Bw—6 to 20 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine and medium angular blocky structure; soft, very friable, slightly sticky; common fine and medium roots and few coarse roots; common very fine and fine pores; 15 percent pebbles; mildly alkaline (pH 7.8); clear wavy boundary.

Bk—20 to 43 inches; brown (10YR 5/3) very gravelly fine sand, dark brown (10YR 3/3) moist; single grain; loose; few medium roots; 40 percent pebbles and 20 percent cobbles; moderately calcareous; disseminated carbonates and some pockets of lime; strongly alkaline (pH 8.6); gradual wavy boundary.

C—43 to 60 inches; light brownish gray (10YR 6/2) gravelly loamy fine sand, brown (10YR 5/3) moist; weak fine and medium angular blocky structure; loose, slightly plastic; common fine pores; 10 percent pebbles and 5 percent cobbles; strongly calcareous; carbonates are disseminated; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more.

Secondary carbonates are at a depth of 18 to 25 inches. Rock fragment content in the particle size control section is 35 to 65 percent.

The A1 horizon is 35 to 50 percent rock fragments.

The Bk horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3. It is very gravelly fine sand or gravelly loamy fine sand. It is moderately calcareous or strongly calcareous.

Bruman Series

The Bruman series consists of very deep, well drained soils on dissected alluvial fans, fan terraces, mountainsides, and hillsides. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 2 to 50 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are loamy-skeletal, mixed Borollic Calciorthids.

Typical pedon of Bruman gravelly loam, 2 to 10 percent slopes, about 0.5 mile east of Panguitch Airport, in the NE¼ of sec. 23, T. 34 S., R. 5 W.

A1—0 to 10 inches; grayish brown (10YR 5/2) gravelly loam, brown (7.5YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots and few medium and coarse roots; few very fine tubular pores; 25 percent pebbles and 5 percent cobbles; slightly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk—10 to 31 inches; white (10YR 8/2) very gravelly loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; 40 percent pebbles and 10 percent cobbles; strongly calcareous; strongly alkaline (pH 8.8); gradual wavy boundary.

2C—31 to 60 inches; light gray (10YR 7/1) very gravelly sand, gray (10YR 5/1) moist; massive; loose; few fine roots; 40 percent pebbles and 20 percent cobbles; 0.25- to 0.50-inch-thick lenses that are strongly cemented with lime; strongly calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 6 to 12 inches. The particle size control section is 8 to 18 percent clay and is 35 to 70 percent rock fragments.

The A horizon has hue of 10YR or 7.5YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 or 3. It is loam, gravelly loam, cobbly loam, or very cobbly loam. Rock fragment content is 5 to 60 percent. The horizon is slightly calcareous or moderately calcareous.

The Bk horizon has value of 6 to 8 when dry and 5 to 7 when moist, and it has chroma of 1 to 3. It is very gravelly loam, very gravelly sandy loam, or very cobbly sandy loam. Rock fragment content is 35 to 60 percent. The horizon is strongly calcareous or very strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

The 2C horizon has hue of 10YR or 7.5YR, value of 6 or 7 when dry and 3 to 6 when moist, and chroma of 1 to 3. It is very cobbly sand, very gravelly loamy sand, or very gravelly sand. Clay content is 1 to 10 percent. Rock fragment content is 40 to 70 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Brycan Series

The Brycan series consists of very deep, well drained soils on alluvial fans and valley plains. These soils formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are 1 to 15 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy, mixed Cumulic Haploborolls.

Typical pedon of Brycan very fine sandy loam, 6 to 15 percent slopes, about 1.5 miles east of Triangle Bryce Canyon, in the NE¼ of sec. 14, T. 37 S., R. 1 W.

A11—0 to 5 inches; brown (7.5YR 5/4) very fine sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and few medium roots; few fine pores; mildly alkaline (pH 7.6); clear smooth boundary.

A12—5 to 12 inches; brown (7.5YR 5/4) very fine sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable; common fine and medium roots; few fine random tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bt1—12 to 30 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; common thin clay films; mildly alkaline (pH 7.6); gradual wavy boundary.

Bt2—30 to 37 inches; reddish yellow (7.5YR 6/6) sandy clay loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine and few medium random tubular pores; few thin clay films; mildly alkaline (pH 7.8); clear smooth boundary.

BC—37 to 47 inches; brownish yellow (10YR 6/6) sandy loam, yellowish brown (10YR 5/6) moist; massive; hard, very friable; few fine roots; few fine random tubular pores; mildly alkaline (pH 7.8); clear wavy boundary.

2Bk—47 to 60 inches; light yellowish brown (10YR 6/4) clay loam, brown (10YR 5/3) moist; massive; hard, firm, sticky and plastic; few fine roots; few fine and medium random tubular pores; moderately calcareous; lime in veins; moderately alkaline (pH 8.4).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 20 to 36 inches thick. The solum is 22 to 40 inches thick.

The A horizon has hue of 5YR to 10YR, and it has chroma of 2 to 4 when dry and 2 or 3 when moist.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 to 6. It is sandy clay loam or loam. Reaction is mildly alkaline or moderately alkaline.

The 2Bk horizon has hue of 5YR to 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 to 6. It is sandy loam, clay loam, or loam. Reaction is mildly alkaline or moderately alkaline.

Bushvalley Series

The Bushvalley series consists of shallow, somewhat excessively drained soils on mountainsides. These soils formed in residuum derived dominantly from basic and intermediate igneous rock. Slopes are 15 to 40 percent. Elevation is 8,300 to 9,000 feet. Average annual precipitation is 16 to 18 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are loamy-skeletal, mixed Argic Lithic Cryoborolls.

Typical pedon of Bushvalley very stony loam, 15 to 40 percent slopes, about 11 miles northwest of Bear Valley Junction, in the NE¼ of sec. 17, T. 31 S., R. 5 W.

A—0 to 11 inches; dark brown (7.5YR 4/2) very stony loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; few fine and medium pores; 15 percent pebbles, 25 percent cobbles, and 15 percent stones; neutral (pH 6.8); clear smooth boundary.

Bt—11 to 19 inches; brown (7.5YR 4/2) very cobbly sandy clay loam, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few fine, medium, and coarse roots; few fine and medium pores; common thin clay films on faces of peds; 25 percent pebbles and 25 percent cobbles; neutral (pH 6.6); abrupt wavy boundary.

R—19 inches; igneous bedrock.

Depth to bedrock and thickness of the solum are 10 to 20 inches. The mollic epipedon is 16 to 20 inches thick. The particle size control section is 35 to 60 percent rock fragments and averages 20 to 30 percent clay.

Callings Series

The Callings series consists of very deep, well drained soils on mountainsides and ridgetops. These soils formed in alluvium and residuum derived from intermediate volcanic rock. Slopes are 5 to 30 percent. Elevation is 9,400 to 10,500 feet. Average annual precipitation is 20 to 30 inches, and average annual air temperature is 34 to 38 degrees F.

These soils are clayey-skeletal, montmorillonitic Boralfic Cryoborolls.

Typical pedon of a Callings loam in an area of Callings-Winnemucca association, 5 to 15 percent slopes, in Winnemucca Flats, in the center of sec. 6, T. 32 S., R. 3 W.

O1 and O2—1 inch to 0; aspen leaves, twigs, and duff.

A1—0 to 3 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many very fine interstitial pores; 5 percent pebbles; neutral (pH 6.7); gradual smooth boundary.

A2—3 to 11 inches; dark brown (7.5YR 3/2) loam, very dark brown (7.5YR 2/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; many fine and medium roots and few coarse roots; common fine interstitial pores; 10 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

E—11 to 18 inches; brown (7.5YR 5/2) cobbly loam, dark brown (7.5YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine and medium roots and few coarse roots; common fine interstitial pores and few fine tubular pores; 15 percent pebbles and 15 percent cobbles; slightly acid (pH 6.2); clear wavy boundary.

Bt1—18 to 24 inches; reddish brown (5YR 4/4) very cobbly clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable; slightly sticky and slightly plastic; common very fine, medium, and coarse roots; common fine interstitial pores and few fine tubular pores; few thin clay films on faces of peds; 30 percent cobbles and 10 percent pebbles; slightly acid (pH 6.5); gradual wavy boundary.

Bt2—24 to 32 inches; reddish brown (5YR 4/4) very cobbly clay, dark reddish brown (5YR 3/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few very fine, medium, and coarse roots; few medium interstitial pores and common fine tubular pores; pinkish gray (7.5YR 7/2) extremely hard noncalcareous precipitate on the bottom of rock fragments; many moderately thick clay films on faces of peds; 30 percent cobbles and 30 percent pebbles; slightly acid (pH 6.5); gradual wavy boundary.

Bt3—32 to 45 inches; reddish brown (5YR 5/4) extremely cobbly clay loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; common coarse interstitial pores; pinkish gray (7.5YR 7/2) extremely hard noncalcareous precipitate on the bottom of some fragments; few thin clay films in pores; 50 percent cobbles and 30 percent pebbles; neutral (pH 7.0); gradual wavy boundary.

C—45 to 60 inches; yellowish red (5YR 5/6) extremely gravelly clay loam, yellowish red (5YR 4/6) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few fine and coarse interstitial pores; pinkish gray (7.5YR 7/2) extremely hard noncalcareous precipitate on the bottom of some rock fragments; 40 percent fine pebbles, 25 percent medium and coarse pebbles, and 10 percent cobbles; mildly alkaline (pH 7.5).

The mollic epipedon is 10 to 15 inches thick. Bedrock is at a depth of 6 to 10 feet.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 1 to 3 when moist, and chroma of 1 to 3.

The E horizon has hue of 7.5YR or 10YR, value of or 6 when dry, and chroma of 2 or 3. It is loam, fine sandy loam, gravelly fine sandy loam, gravelly loam, or cobbly loam.

The Bt horizon has hue of 5YR or 7.5YR, and it has value of 4 or 5 when dry and 3 or 4 when moist. It is clay loam or clay and is 35 to 60 percent pebbles and cobbles.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry, and chroma of 4 to 6.

Cannonville Series

The Cannonville series consists of shallow, well drained soils on the sides of ridges and on shale hills. These soils formed in residuum derived dominantly from shale. Slopes are 10 to 50 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 8 to 12 inches, and average annual air temperature is 46 to 4 degrees F.

These soils are clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents.

Typical pedon of Cannonville clay, 10 to 50 percent slopes, about 1 mile east of Tropic, in the SE¼ of sec. 36, T. 36 S., R. 3 W.

A—0 to 7 inches; light olive gray (5Y 6/2) clay, olive gray (5Y 5/2) moist; weak very fine platy structure; soft, firm, sticky and plastic; few fine, medium, and coarse roots; common fine and medium pores; strongly calcareous; moderately alkaline (pH 8.0); abrupt smooth boundary.

Cr—7 inches; shale.

Paralithic contact is at a depth of 7 to 20 inches.

The A horizon has hue of 2.5Y or 5Y, and it has value of 5 to 7 when dry and 4 or 5 when moist. It is very stony clay or clay. Rock fragment content is 0 to 55 percent. The horizon is strongly calcareous or very strongly calcareous. It is moderately alkaline or strongly alkaline.

The C horizon, if it occurs, has hue of 5Y or 2.5Y, value of 6 or 7 when dry and 5 or 6 when moist, and chroma of 2 or 3. Clay content is 40 to 50 percent. The horizon is strongly calcareous or very strongly calcareous. It is moderately alkaline or strongly alkaline.

Castino Series

The Castino series consists of moderately deep, well drained soils on hills, mountains, and basalt flows. These soils formed in colluvium and residuum derived from basic and intermediate volcanic rock. Slopes are to 50 percent. Elevation is 8,300 to 9,600 feet. Average annual precipitation is 16 to 22 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of a Castino extremely cobbly loam that has slopes of 20 to 50 percent in an area of Castino-Tica Family complex, 20 to 70 percent slopes; in the NE¼ of sec. 24, T. 34 S., R. 4 W.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) extremely cobbly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many fine interstitial pores; 20 percent pebbles, 40 percent cobbles, and 3 percent stones; slightly acid (pH 6.5); clear smooth boundary.

A2—3 to 8 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; common fine and few very fine roots; common fine interstitial pores; 20 percent pebbles and 5 percent cobbles; slightly acid (pH 6.5); gradual wavy boundary.

Bw—8 to 14 inches; dark brown (7.5YR 3/2) gravelly clay loam, very dark brown (7.5YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; common fine interstitial and tubular pores; few thin clay films in pores; 20 percent pebbles and 10 percent cobbles; slightly acid (pH 6.5); clear wavy boundary.

Bt1—14 to 31 inches; brown (7.5YR 4/2) very cobbly clay, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and medium roots; few fine and coarse interstitial pores; many thin clay films on faces of peds; 50 percent cobbles; neutral (pH 7.0); gradual wavy boundary.

Bt2—31 to 38 inches; brown (7.5YR 5/4 and 7.5YR 4/2) extremely cobbly clay loam, dark brown (7.5YR 4/4 and 7.5YR 3/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common thin clay films on faces of peds; noncalcareous white coatings on rock fragments; 60 percent cobbles, 10 percent stones, and 5 percent pebbles; neutral (pH 7.0); abrupt irregular boundary.

—38 inches; fractured bedrock (intermediate volcanic agglomerate).

Bedrock is at a depth of 20 to 40 inches. The mollic pipedon is 16 to 35 inches thick. The particle size control section is 35 to 45 percent clay and 35 to 75 percent rock fragments.

The A and Bw horizons have hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. The A horizon is extremely cobbly loam over gravelly loam or gravelly silt loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 to 6. It is extremely cobbly clay loam or very cobbly clay.

Circleville Series

The Circleville series consists of moderately deep, well drained soils on mountainsides. These soils formed in alluvium derived dominantly from intermediate igneous rock. Slopes are 25 to 60 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are loamy-skeletal, mixed Aridic Argiborolls.

Typical pedon of a Circleville very gravelly loam in an area of Circleville-Rock outcrop complex, 25 to 60 percent slopes, in Smith Canyon, in the NE¼ of sec. 10, T. 33 S., R. 4.5 W.

A—0 to 2 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, slightly sticky; common fine and medium roots; common fine interstitial pores; 45 percent pebbles, 10 percent cobbles, and 2 percent stones; mildly alkaline (pH 7.5); clear smooth boundary.

Bt—2 to 9 inches; brown (7.5YR 4/2) very gravelly clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; few fine interstitial pores; common thin clay films on faces of peds and in pores; 25 percent pebbles and 10 percent cobbles; mildly alkaline (pH 7.5); gradual wavy boundary.

Btk—9 to 17 inches; pinkish gray (7.5YR 6/2) very cobbly loam, brown (7.5YR 4/2) moist; weak medium and coarse subangular blocky structure; soft, friable, slightly sticky; common very fine coarse roots; few fine interstitial pores; 25 percent cobbles, 10 percent stones, and 5 percent pebbles; slightly calcareous; mildly alkaline (pH 7.8); clear wavy boundary.

Bk—17 to 24 inches; very pale brown (10YR 7/3) very cobbly loam, pale brown (10YR 6/3) moist; massive; slightly hard, firm, slightly sticky; few very fine roots; few fine and medium interstitial pores; 25 percent cobbles, 10 percent stones, and 5 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.4); abrupt wavy boundary.

R—24 inches; bedrock (intermediate volcanic agglomerate).

Bedrock is at a depth of 20 to 36 inches. The mollic epipedon is 7 to 14 inches thick. The particle size control section is 35 to 60 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. It is very gravelly loam or very cobbly loam. Rock fragment content is 50 to 60 percent.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. It is very gravelly clay loam or very cobbly clay loam. Clay content is 28 to 35 percent. Rock fragment content is 35 to 60 percent. The Btk horizon is absent in some pedons.

The Bk horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 or 3. It is very cobbly loam or very cobbly sandy loam. Rock fragment content is 35 to 60 percent. The horizon is strongly calcareous or very strongly calcareous.

Clapper Series

The Clapper series consists of very deep, well drained soils on fan terraces, sides of benches, ridges, and mountainsides. These soils formed in alluvium derived dominantly from mixed sedimentary rock. Slopes are 2 to 60 percent. Elevation is 6,300 to 7,200 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are loamy-skeletal, mixed, mesic Ustollic Calciorthids.

Typical pedon of Clapper cobbly loam, 5 to 30 percent slopes, about 4.5 miles north of Henrieville, on Coal Bench; about 1,600 feet south and 200 feet west of the northeast corner of sec. 34, T. 36 S., R. 2 W.

A—0 to 3 inches; brown (10YR 5/3) cobbly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine pores; 10 percent pebbles and 20 percent cobbles; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bw—3 to 10 inches; brown (10YR 5/3) cobbly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots and few medium and coarse roots; common very fine and few fine pores; 15 percent pebbles and 10 percent cobbles; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.0); clear smooth boundary.

Bk1—10 to 20 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and medium roots and common coarse roots; few very fine and fine pores; 40 percent pebbles and 10 percent cobbles; strongly calcareous; carbonates are in soft masses and on rock fragments; moderately alkaline (pH 8.2); clear wavy boundary.

Bk2—20 to 39 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; massive; very hard, firm, slightly sticky and plastic; few very fine roots; few very fine pores; 40 percent pebbles and 15 percent cobbles; strongly calcareous; carbonates are in soft masses and on rock fragments; moderately alkaline (pH 8.2); clear wavy boundary.

C—39 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, slightly sticky and plastic; few very fine roots; few very fine pores; 35 percent pebbles and 10 percent cobbles; strongly calcareous; carbonates are disseminated; strongly alkaline (pH 8.5).

Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 8 to 19 inches. The particle size control section is 35 to 60 percent rock fragments.

The A horizon is 15 to 40 percent rock fragments.

The Bk horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 to 6. Clay content is 18 to 27 percent. Reaction is moderately alkaline or strongly alkaline.

Codley Series

The Codley series consists of very deep, well drained soils on dissected alluvial fans and valley plains. These soils formed in alluvium derived dominantly from limestone and sandstone. Slopes are 1 to 5 percent.

Elevation is 6,500 to 7,200 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-silty, carbonatic, frigid Ustic Torriorthents.

Typical pedon of Codley silt loam, 1 to 2 percent slopes, about 1,800 feet north and 600 feet east of the southwest corner of sec. 19, T. 35 S., R. 4.5 W.

A—0 to 7 inches; light brown (7.5YR 6/4) silt loam, dark brown (7.5YR 4/4) moist; weak thick platy structure parting to weak fine granular; hard, friable, sticky and plastic; common fine roots and few medium and coarse roots; common fine and very fine tubular pores; very strongly calcareous; strongly alkaline (pH 8.6); clear smooth boundary.

C1—7 to 17 inches; light brown (7.5YR 6/4) silt loam, brown (7.5YR 5/4) moist; massive; very hard, friable, sticky and plastic; few fine, medium, and coarse roots; common fine tubular pores and few coarse tubular pores; very strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

C2—17 to 30 inches; pink (5YR 7/4) silty clay loam, yellowish red (5YR 5/6) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few fine and many very fine roots; many very fine and few coarse tubular pores; very strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

C3—30 to 60 inches; pink (7.5YR 7/4) silt loam, strong brown (7.5YR 5/6) moist; weak fine granular structure; very hard, firm, sticky and plastic; few fine roots; many very fine and few coarse tubular pores; very strongly calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more.

The C horizon has hue of 7.5YR or 5YR, value of 6 or 7 when dry and 5 when moist, and chroma of 4 to 6. It is silt loam or silty clay loam. Clay content is 18 to 35 percent.

Comodore Series

The Comodore series consists of shallow, well drained soils on mountainsides and ridgetops. These soils formed in residuum and alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 15 to 40 percent. Elevation is 6,800 to 7,500 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are loamy-skeletal, mixed Lithic Haploborolls.

Typical pedon of a Comodore extremely cobbly clay loam in an area of Comodore-Rock outcrop, 15 to 40 percent slopes, about 2 miles northwest of Bear Valley Junction, in the SE¼ of sec. 30, T. 32 S., R. 5 W.

A—0 to 6 inches; brown (7.5YR 4/2) extremely cobbly clay loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, firm, sticky and plastic; few fine and very fine roots; common fine and very fine tubular pores; 25 percent pebbles and 40 percent cobbles; mildly alkaline (pH 7.4); clear wavy boundary.

C—6 to 13 inches; brown (7.5YR 4/3) very cobbly clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; few fine interstitial pores; 25 percent pebbles and 25 percent cobbles; mildly alkaline (pH 7.8).

R—13 inches; igneous bedrock.

Depth to bedrock is 10 to 20 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist, and chroma of 2 or 3.

The C horizon is 28 to 35 percent clay. Rock fragment content is 45 to 60 percent.

Crestline Series

The Crestline series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 2 to 4 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature to 46 to 49 degrees F.

These soils are coarse-loamy, mixed, mesic Xerollic Camborthids.

Typical pedon of Crestline fine sandy loam, 2 to 4 percent slopes, about 14 miles northeast of Bear Valley Junction, about 200 feet north and 400 feet west of the southeast corner of sec. 2, T. 31 S., R. 4 W.

A—0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky; common very fine and fine roots; common very fine and fine pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bw1—3 to 14 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable; common fine and medium roots; common very fine and fine pores; 0 to 5 percent pebbles; mildly alkaline (pH 7.6); clear smooth boundary.

Bw2—14 to 20 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky; few fine and medium roots; common fine and very fine pores; 0 to 5 percent pebbles; slightly calcareous; moderately alkaline (pH 8.2); abrupt smooth boundary.

Bk—20 to 47 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to single grain; slightly hard, very friable, slightly sticky; few very fine pores; moderately calcareous; lime is disseminated; moderately alkaline (pH 8.4); clear wavy boundary.

C3—47 to 60 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to single grain; soft, very friable, slightly sticky; few very fine pores; noncalcareous; mildly alkaline (pH 7.8).

The mollic epipedon is 10 to 15 inches thick. Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 16 to 20 inches. The particle size control section is 8 to 18 percent clay and 0 to 5 percent rock fragments.

The A horizon has chroma of 2 or 3.

The Bw horizon is noncalcareous or slightly calcareous. It is mildly alkaline or moderately alkaline.

The Bk horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3. Rock fragment content is 0 to 5 percent. The horizon is moderately calcareous or strongly calcareous.

Dalcan Series

The Dalcan series consists of moderately deep, well drained soils on mountainsides and dissected alluvial fans. These soils formed in residuum derived dominantly from basic and intermediate igneous rock. Slopes are 4 to 25 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are clayey-skeletal, montmorillonitic Pachic Argiborolls.

Typical pedon of Dalcan very cobbly loam, dry, 4 to 25 percent slopes, about 8 miles northwest of Bear Valley Junction, in the SW¼ of sec. 6, T. 32 S., R. 5 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak medium platy structure parting to moderate fine granular; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine tubular pores; 30 percent pebbles, 20 percent cobbles, and 5 percent stones; neutral (pH 7.0); clear smooth boundary.

Bw—4 to 10 inches; dark grayish brown (10YR 4/2) very gravelly clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; 35 percent pebbles; neutral (pH 6.8); clear wavy boundary.

Bt1—10 to 15 inches; brown (10YR 4/3) very gravelly clay, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; hard, very firm, sticky and very plastic; common very fine roots; common very fine tubular pores; moderately thick patchy clay films on faces of peds; 30 percent pebbles and 10 percent cobbles; neutral (pH 6.8); clear wavy boundary.

Bt2—15 to 22 inches; brown (10YR 4/3) very cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; moderately thick continuous clay films on faces of peds; 35 percent pebbles and 20 percent cobbles; neutral (pH 6.8); gradual wavy boundary.

R—22 inches; partly decomposed igneous rock.

The mollic epipedon is 20 to 25 inches thick. Bedrock is at a depth of 20 to 40 inches. The particle size control section is 35 to 45 percent clay and 40 to 55 percent rock fragments.

The Bt horizon has hue of 10YR or 7.5YR, and it has chroma of 2 or 3. It is very gravelly clay or very cobbly clay loam.

Descot Series

The Descot series consists of very deep, well drained soils on dissected alluvial fans and valley plains. These soils formed in alluvium derived dominantly from limestone and sandstone. Slopes are 1 to 5 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are coarse-loamy, carbonatic, frigid Ustic Torriorthents.

Typical pedon of Descot silt loam, 2 to 5 percent es, about 2,600 feet west and 2,600 feet south of northeast corner of sec. 7, T. 35 S., R. 4 W.

0 to 5 inches; pink (7.5YR 7/4) silt loam, brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common very fine and few fine tubular pores; very strongly calcareous; strongly alkaline (pH 8.6); clear smooth boundary.

—5 to 22 inches; pink (7.5YR 7/4) very fine sandy loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common very fine tubular pores and few fine and medium tubular pores; very strongly calcareous; strongly alkaline (pH 8.8); clear smooth boundary.

2—22 to 39 inches; pink (7.5YR 7/4) very fine sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine and few medium roots; common fine tubular pores; very strongly calcareous; strongly alkaline (pH 8.8); gradual wavy boundary.

3—39 to 60 inches; pink (7.5YR 7/4), stratified very fine sandy loam and fine sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium tubular pores; lenses of fine sandy loam 2 to 4 inches thick; very strongly calcareous; strongly alkaline (pH 8.5).

Bedrock is at a depth of 60 inches or more.
arbonate equivalent is 40 to 50 percent.
The C horizon is 10 to 18 percent clay.

imyaw Family

The Dimyaw Family consists of very deep, well ained soils on structural benches and mountainsides. ese soils formed in alluvium derived dominantly from ale. Slopes are 4 to 25 percent. Elevation is 7,300 to 500 feet. Average annual precipitation is 14 to 16 hes, and average annual air temperature is 40 to 44 grees F.

These soils are fine, montmorillonitic (calcareous), id Typic Ustorthents.

Typical pedon of Dimyaw Family gravelly loam, 4 to percent slopes, eroded, about 2,200 feet east and 00 feet north of the southwest corner of sec. 31, T. S., R. 3 W.

0 to 7 inches; grayish brown (10YR 5/2) gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few fine and medium pores; 30 percent pebbles; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary.

C1—7 to 27 inches; light gray (2.5Y 7/2) clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, firm, sticky and plastic; few fine, medium, and coarse roots; few fine and medium pores; 5 percent pebbles; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); clear wavy boundary.

C2—27 to 60 inches; light gray (2.5Y 7/2) clay, light brownish gray (2.5Y 6/2) moist; massive; hard, very firm, sticky and plastic; few fine and medium roots; few fine pores; strongly calcareous; carbonates are disseminated; strongly alkaline (pH 8.5).

Bedrock is at a depth of 60 inches or more. The particle size control section is 35 to 45 percent clay and 0 to 5 percent rock fragments.

The C horizon has value of 5 or 6 when moist. It is clay or clay loam. Reaction is moderately alkaline or strongly alkaline.

Echard Series

The Echard series consists of very deep, well drained soils on dissected alluvial fans and benches. These soils formed in alluvium derived from soft rhyolitic tuff and strongly cemented ash. Slopes are 5 to 30 percent. Elevation is 8,500 to 8,900 feet. Average annual precipitation is 20 to 22 inches, and average annual air temperature is 38 to 41 degrees F.

These soils are fine, mixed Argic Cryoborolls.

Typical pedon of Echard loam, 5 to 30 percent slopes, at the head of Sanford Creek, in the NW¼ of sec. 29, T. 33 S., R. 4 W.

O1—1 inch to 0; aspen leaves and conifer needles.

A—0 to 5 inches; gray (10YR 5/1) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; many fine and medium roots; few fine interstitial pores; 8 percent pebbles and 5 percent cobbles; medium acid (pH 6.0); clear wavy boundary.

Bt1—5 to 15 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; common fine and medium roots; few fine interstitial and tubular pores; common moderately thick clay films on faces of peds and in pores; 5 percent pebbles and 8 percent cobble-sized angular fragments of soft tuff or weakly cemented ash; medium acid (pH 6.0); gradual wavy boundary.

Bt2—15 to 20 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium and fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common fine and medium roots; few fine tubular pores; few thin clay films on faces of peds and in pores; 5 percent pebbles and 8 percent cobble-sized fragments of soft tuff or weakly cemented ash; medium acid (pH 6.0); gradual wavy boundary.

Bt3—20 to 25 inches; light brownish gray (10YR 6/2) cobbly clay loam, dark gray (10YR 4/1) moist; weak medium subangular blocky structure; slightly hard, firm, sticky and plastic; common medium and few very fine roots; common very fine tubular pores; common thin clay films on faces of peds; 10 percent pebbles and 15 percent cobble-sized fragments of soft tuff or weakly cemented ash; slightly acid (pH 6.5); gradual irregular boundary.

Bt4—25 to 60 inches; pale brown (10YR 6/3) cobbly loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine and medium roots; few thin clay films in pores; 10 percent pebbles and 15 percent cobble-sized fragments of soft tuff or weakly cemented ash; slightly acid (pH 6.5).

The mollic epipedon is 12 to 16 inches thick. Depth to soft rhyolitic tuff or strongly cemented ash is estimated to be 5 to 10 feet.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 1 or 2.

The upper part of the Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry, and chroma of 1 or 2. It is clay loam, cobbly clay loam, or clay and is about 35 to 42 percent clay. Rock fragment content in the upper 20 inches of the Bt horizon averages less than 20 percent.

The Bt4 horizon and the C horizon, where present, have value of 5 to 7 when dry and 4 or 5 when moist, and they have chroma of 2 or 3. They are cobbly loam or cobbly clay loam.

Ess Series

The Ess series consists of very deep, well drained soils on mountainsides and ridges. These soils formed in colluvium and residuum derived from intermediate volcanic rock. Slopes are 25 to 45 percent. Elevation is 9,400 to 10,500 feet. Average annual precipitation is 20 to 25 inches, and average annual air temperature is 35 to 38 degrees F.

These soils are loamy-skeletal, mixed Argic Cryoborolls.

Typical pedon of an Ess gravelly fine sandy loam in an area of Ess-Callings association, 15 to 45 percent slopes, south of Cottonwood Pass, in the SW¼ of sec. 3, T. 33 S., R. 4 W.

A1—0 to 1.5 inches; grayish brown (10YR 5/2) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse granular structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; few fine pores; 20 percent angular pebbles and 10 percent angular cobbles; medium acid (pH 6.0); abrupt smooth boundary.

A2—1.5 to 7.0 inches; grayish brown (10YR 5/2) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; few medium roots and many fine and very fine roots; few very fine pores; 15 percent angular pebbles and 10 percent subangular cobbles; neutral (pH 7.0); clear wavy boundary.

A3—7 to 11 inches; dark grayish brown (10YR 4/2) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak medium granular; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; few fine pores; 15 percent angular pebbles and 10 percent subangular cobbles; neutral (pH 7.0); abrupt wavy boundary.

Bt1—11 to 15 inches; yellowish brown (10YR 5/4) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to moderate very fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; common clay films on faces of peds and in pores; many fine and very fine roots; 40 percent subangular cobbles; mildly alkaline (pH 7.5); abrupt wavy boundary.

Bt2—15 to 23 inches; yellowish brown (10YR 5/4) extremely cobbly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure parting to moderate very fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; common thin clay films on faces of peds; few medium and fine roots; common fine pores; 70 percent angular and subangular cobbles; mildly alkaline (pH 7.5); clear wavy boundary.

Bw—23 to 60 inches; pale brown (10YR 6/3) extremely cobbly loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few fine pores; 85 percent angular and subrounded cobbles; mildly alkaline (pH 7.5).

Bedrock is at a depth of 60 inches or more. The particle size control section averages 35 to 85 percent rock fragments. The mollic epipedon is 10 to 15 inches thick.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4. It is very cobbly clay loam or extremely cobbly clay loam.

The Bw horizon is extremely gravelly loam or extremely cobbly loam.

Evanston Series

The Evanston series consists of very deep, well drained soils on dissected alluvial fans, valley plains, and mountainsides. These soils formed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are 2 to 25 percent. Elevation is 6,800 to 7,500 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed Aridic Argiborolls.

Typical pedon of Evanston loam, 2 to 8 percent slopes, about 0.25 mile southeast of Bryce Canyon Airport, in the NW¼ of sec. 5, T. 36 S., R. 3 W.

A1—0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak thin platy structure parting to weak fine granular; soft, very friable, slightly plastic; many fine and few medium roots; few fine pores; mildly alkaline (pH 7.4); clear smooth boundary.

Bt—4 to 15 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common fine pores; few thin clay films; mildly alkaline (pH 7.4); clear wavy boundary.

Bk1—15 to 25 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common fine and few coarse pores; moderately calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2—25 to 41 inches; light brownish gray (10YR 6/2) loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; common fine pores; strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

C—41 to 60 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable; few fine roots; few fine pores; moderately calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 15 to 20 inches. The mollic epipedon is 9 to 15 inches thick. The solum is 15 to 25 inches thick.

The A horizon has hue of 10YR or 7.5YR, and it has chroma of 2 or 3. It is loam or very cobbly loam. Rock fragment content is 0 to 55 percent.

The Bt horizon has value of 5 when dry and 3 when moist, and it has chroma of 2 or 4. Clay content is 18 to 32 percent.

The Bk and C horizons have hue of 2.5Y or 10YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 2 to 4. They are loam or sandy loam. Carbonate equivalent is 10 to 20 percent.

Frandsen Series

The Frandsen series consists of very deep, well drained soils on valley bottoms, dissected alluvial fans, and mountain foot slopes. These soils formed in alluvium and colluvium derived dominantly from sandstone, limestone, and shale. Slopes are 1 to 50 percent. Elevation is 6,800 to 8,500 feet. Average annual precipitation is 12 to 16 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed (calcareous), frigid Typic Ustorthents.

Typical pedon of Frandsen loam, dry, 1 to 15 percent slopes, about 1,600 feet south and 2,600 feet east of the northwest corner of sec. 3, T. 36 S., R. 3 W.

A—0 to 3 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common fine pores; 10 percent pebbles; strongly calcareous; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bw—3 to 21 inches; light brown (7.5YR 6/4) loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, friable, slightly plastic; few fine, medium, and coarse roots; few coarse and very fine pores; 5 percent pebbles; strongly calcareous; strongly alkaline (pH 8.6); gradual smooth boundary.

Bk1—21 to 37 inches; pinkish gray (7.5YR 6/2) loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; few very fine pores; 10 percent pebbles; few fine lime flakes; strongly calcareous; strongly alkaline (pH 8.8); clear wavy boundary.

Bk2—37 to 43 inches; pale brown (10YR 6/3) loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; 10 percent pebbles; few fine carbonate flakes; strongly calcareous; strongly alkaline (pH 8.6); clear wavy boundary.

C—43 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine pores; 10 percent pebbles; strongly calcareous; strongly alkaline (pH 8.8).

Bedrock is at a depth of 60 inches or more. The particle size control section is 0 to 10 percent rock fragments.

The A horizon has hue of 10YR to 5YR, value of 5 or 6 when dry, and chroma of 2 to 4. It is loam or gravelly loam. Rock fragment content is 10 to 35 percent.

The Bk and C horizons have hue of 10YR to 5YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 2 to 4. They are loam or clay loam. Clay content is 20 to 35 percent. Reaction is moderately alkaline or strongly alkaline.

Fughes Series

The Fughes series consists of very deep, well drained soils in alluvial valleys. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 0 to 4 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 15 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are fine, montmorillonitic Pachic Argiborolls.

Typical pedon of Fughes silty clay loam, 0 to 4 percent slopes, about 8 miles north-northwest of Bear Valley Junction, in the SE¼ of sec. 31, T. 31 S., R. 5 W.

A—0 to 4 inches; dark brown (10YR 4/3) silty clay loam, very dark brown (10YR 2/2) moist; moderate thin platy structure; slightly hard, firm, sticky and plastic; few medium and fine roots; few medium and fine vesicular pores; neutral (pH 7.0); clear smooth boundary.

Bw—4 to 10 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; extremely hard, firm, sticky and plastic; few fine and medium roots and common very fine roots; common fine and few medium tubular pores; neutral (pH 7.0); clear wavy boundary.

Bt1—10 to 23 inches; dark brown (10YR 4/3) silty clay, very dark brown (10YR 2/2) moist; moderate medium prismatic structure parting to strong fine angular blocky; extremely hard, very firm, very sticky and very plastic; few very fine and medium roots; common fine and few medium tubular pores; moderate continuous clay films on faces of peds; neutral (pH 6.8); gradual irregular boundary.

Bt2—23 to 53 inches; yellowish brown (10YR 5/4) clay, dark brown (10YR 3/3) moist; common fine distinct yellowish red (5YR 4/6) mottles; strong medium prismatic structure parting to strong fine angular blocky; very hard, very firm, very sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; thin continuous clay films on faces of peds; neutral (pH 7.2); gradual wavy boundary.

Bt3—53 to 60 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; strong coarse prismatic structure parting to moderate fine angular blocky; very hard, firm, sticky and plastic; few very fine and fine roots; few very fine and medium tubular pores; thin patchy clay films on faces of peds; noncalcareous; mildly alkaline (pH 7.3).

Bedrock is at a depth of 60 inches or more.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 to 4. It is silty clay, clay, or clay loam. Clay content is 35 to 45 percent.

Gerst Family

The Gerst Family consists of shallow, well drained soils on mountainsides. These soils formed in residuum rived dominantly from shale and sandstone. Slopes e 20 to 70 percent. Elevation is 6,000 to 6,600 feet. erage annual precipitation is 9 to 12 inches, and erage annual air temperature is 46 to 49 degrees F.

These soils are loamy, mixed (calcareous), mesic, hallow Ustic Torriorthents.

Reference pedon of a Gerst Family loam in an area Gerst Family-Rock outcrop complex, 20 to 70 percent opes, about 2 miles south of Cannonville, about 2,100 eet south and 400 feet west of the northeast corner of ec. 35, T. 37 S., R. 3 W.

A—0 to 3 inches; reddish brown (5YR 5/3) loam, dark reddish brown (5YR 3/4) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common fine and medium pores; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary.

C—3 to 12 inches; reddish brown (5YR 5/3) loam, reddish brown (5YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine and fine pores; 5 percent pebbles; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); clear wavy boundary.

Cr—12 inches; shale.

Shale is at a depth of 10 to 20 inches. The particle size control section averages 18 to 27 percent clay and 0 to 5 percent rock fragments.

The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4. Rock ragment content is 0 to 10 percent. Gypsum occurs as soft masses or veins.

The C horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4. It is loam or clay loam. Rock fragment content is 0 to 10 percent. Gypsum occurs as soft masses or veins.

Greenhalgh Series

The Greenhalgh series consists of very deep, well drained soils on low-lying alluvial fans. These soils ormed in alluvium derived dominantly from mixed sedimentary and igneous rock. Slopes are 1 to 5 percent. Elevation is 6,500 to 7,200 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-silty, mixed (calcareous), frigid Ustic Torrifluvents.

Typical pedon of Greenhalgh silt loam, 2 to 5 percent slopes, about 500 feet north and 1,200 feet west of the southeast corner of sec. 35, T. 32 S., R. 5 W.

A—0 to 2 inches; brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; many fine tubular pores; moderately calcareous; moderately alkaline (pH 8.4); abrupt smooth boundary.

C—2 to 60 inches; brown (10YR 5/3) silt loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; thin lenses of fine sandy loam; moderately calcareous; moderately alkaline (pH 8.0).

Bedrock is at a depth of 60 inches or more.

The A horizon has value of 5 or 6 when dry, and it has chroma of 2 or 3. Reaction is moderately alkaline or strongly alkaline.

The C horizon has value of 5 to 7 when dry and 4 or 5 when moist, and it has chroma of 2 or 3. It is mainly silt loam or loam, but in some pedons sandy loam is below a depth of 40 inches. Clay content is 18 to 27 percent. Carbonate equivalent is 3 to 15 percent. Reaction is moderately alkaline or strongly alkaline.

Grimm Series

The Grimm series consists of very deep, somewhat excessively drained soils on dissected alluvial fans, high stream terraces, and valley plains. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 1 to 5 percent. Elevation is 6,500 to 7,200 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are sandy-skeletal, mixed, frigid Ustic Torriorthents.

Typical pedon of Grimm sandy loam, 1 to 5 percent slopes, about 660 feet south and 400 feet west of the northeast corner of sec. 10, T. 33 S., R. 5 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; common fine and medium roots; few very fine tubular pores; 5 percent pebbles; moderately alkaline (pH 8.2); abrupt smooth boundary.

A2—3 to 8 inches; light brownish gray (10YR 6/2) sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common very fine and few fine tubular pores; 5 percent pebbles; moderately calcareous; strongly alkaline (pH 8.6); clear smooth boundary.

C1—8 to 14 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark gray (10YR 4/1) moist; single grain; hard, very friable; common fine roots; 60 percent pebbles; matrix is weakly cemented; moderately calcareous; strongly alkaline (pH 8.8); clear smooth boundary.

C2—14 to 60 inches; pale brown (10YR 6/3) extremely gravelly sand, dark gray (10YR 4/1) moist; single grain; loose; few fine roots; 60 percent pebbles; slightly calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more. The particle size control section is 35 to 70 percent rock fragments.

The A horizon has value of 5 or 6 when dry and 3 when moist, and it has chroma of 2 or 3. Reaction is moderately alkaline or strongly alkaline.

The C horizon has chroma of 1 to 3. It is extremely gravelly loamy sand or extremely gravelly sand. Clay content is 0 to 5 percent. The particle size control section is 65 to 70 percent rock fragments.

Guben Series

The Guben series consists of very deep, well drained soils on pediments, mountainsides, and stream terraces. These soils formed in alluvium derived from mixed volcanic and sedimentary rock. Slopes are 1 to 50 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 18 inches, and average annual temperature is 40 to 45 degrees F.

These soils are loamy-skeletal, mixed Typic Calciborolls.

Typical pedon of a Guben gravelly loam in an area of Guben-Showalter complex, 2 to 30 percent slopes, on Tom Best Spring Road, in the SE¼ of sec. 21, T. 35 S., R. 4 W.

A1—0 to 1 inch; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist and crushed; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; 30 percent pebbles; slightly calcareous; neutral (pH 7.0); abrupt smooth boundary.

A2—1 to 4 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist and crushed; weak medium platy structure parting to weak very fine granular; soft, very friable; many very fine and fine roots; few very fine pores; 30 percent pebbles; slightly calcareous; neutral (pH 7.0); clear smooth boundary.

AB—4 to 10 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist and crushed; weak medium and coarse subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; few very fine pores; common thin clay bridges; 30 percent pebbles; slightly calcareous; neutral (pH 7.0); clear smooth boundary.

Bt—10 to 14 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 4/3) moist and crushed; weak coarse and medium subangular blocky structure parting to weak fine subangular blocky; common very fine and fine roots; few very fine pores; few thin clay films in pores; 30 percent pebbles and 5 percent cobbles; very strongly calcareous; mildly alkaline (pH 7.5); gradual wavy boundary.

Btk—14 to 22 inches; grayish brown and light gray (10YR 5/2 and 7/2) extremely gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist and crushed; weak medium angular blocky and subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few very fine pores; few thin clay bridges; 50 percent pebbles and 20 percent cobbles; very strongly calcareous; mildly alkaline (pH 7.5); gradual wavy boundary.

Bk1—22 to 40 inches; light gray (10YR 7/2) extremely gravelly sandy clay loam, brown (10YR 5/3) moist and crushed; massive; loose, friable; few fine roots; 10 percent cobbles and 50 percent pebbles; very strongly calcareous; moderately alkaline (pH 7.7); clear smooth boundary.

Bk2—40 to 44 inches; white (10YR 8/2) very gravelly loam, light gray (10YR 7/2) moist; weak to moderate thin platy structure; slightly sticky and slightly plastic; laminar in some places; weakly cemented to strongly cemented; few fine roots in fractures; few fine tubular pores; 50 percent pebbles and 10 percent cobbles; very strongly calcareous; moderately alkaline (pH 8.0); abrupt smooth boundary.

C—44 to 60 inches; light gray (10YR 7/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; common medium and coarse interstitial pores; 50 percent pebbles and 15 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0).

The mollic epipedon is 7 to 12 inches thick. Depth to the Bk horizon ranges from 10 to 24 inches. The particle size control section averages 35 to 60 percent rock fragments. Bedrock is at a depth of 60 inches or more.

The A and AB horizons have hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 to 4 when dry and 2 or 3 when moist. They are gravelly loam or very gravelly loam.

The Bt and Btk horizons have hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 7 when moist, and chroma of 2 to 4. They are gravelly loam, very gravelly loam, very gravelly sandy clay loam, gravelly sandy clay loam, or extremely gravelly sandy clay loam.

The Bk horizon has hue of 7.5YR or 10YR, value of 4 to 8 when dry, and chroma of 2 to 4. It is very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam, very gravelly sandy clay loam, or extremely gravelly sandy clay loam.

Harol Series

The Harol series consists of very deep, well drained soils on mountainsides, dissected alluvial fans, and benches. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 2 to 50 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 18 inches, and average annual air temperature is 36 to 44 degrees F.

These soils are loamy-skeletal, mixed Typic Argiborolls.

Typical pedon of Harol very cobbly loam, 15 to 40 percent slopes, about 2,000 feet north and 1,900 feet east of the southwest corner of sec. 28, T. 31 S., R. 5 W.

A—0 to 5 inches; dark brown (10YR 3/3) very cobbly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine and medium tubular pores; 20 percent pebbles, 30 percent cobbles, and 10 percent stones; neutral (pH 7.0); clear smooth boundary.

Bt1—5 to 9 inches; brown (7.5YR 4/2) very cobbly clay loam, dark brown (7.5YR 3/2) moist; moderate medium angular blocky structure; very hard, firm, sticky and plastic; common fine and very fine roots and few medium roots; common fine and medium tubular pores; few thin clay films; 20 percent pebbles, 15 percent cobbles, and 2 percent stones; neutral (pH 7.2); abrupt smooth boundary.

Bt2—9 to 16 inches; brown (7.5YR 5/3) very cobbly clay loam, dark brown (7.5YR 3/2) moist; moderate coarse angular blocky structure; very hard, firm, sticky and plastic; common fine and very fine roots and few medium roots; common fine and medium tubular pores; few thin clay films; 20 percent pebbles, 15 percent cobbles, and 2 percent stones; neutral (pH 7.2); clear smooth boundary.

Bt3—16 to 25 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate coarse angular blocky structure; very hard, firm, sticky and plastic; few fine roots; few fine tubular pores; few thin clay films; 20 percent pebbles, 20 percent cobbles, and 2 percent stones; noncalcareous; mildly alkaline (pH 7.4); clear wavy boundary.

C1—25 to 40 inches; brown (10YR 5/3) extremely cobbly loamy sand, dark brown (10YR 3/3) moist; single grain; very friable; slightly cemented; few fine roots; few fine interstitial pores; 30 percent pebbles, 30 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.4); clear smooth boundary.

C2—40 to 60 inches; pale brown (10YR 6/3) extremely cobbly sand, brown (10YR 4/3) moist; single grain; loose; few fine roots; few fine interstitial pores; 30 percent pebbles, 30 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.4).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 12 to 16 inches thick. The solum is 25 to 26 inches thick.

The A horizon has value of 3 or 4 when dry and 2 or 3 when moist, and it has chroma of 2 or 3.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4. Clay content is 28 to 35 percent. Rock fragment content is 35 to 50 percent. Reaction is neutral or mildly alkaline.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 to 4. It is extremely cobbly loamy sand, extremely cobbly sand, very cobbly loamy sand, or very cobbly clay loam. Reaction is neutral or mildly alkaline.

Hatch Series

The Hatch series consists of moderately deep, well drained soils on mountainsides, ridges, and benches. These soils formed in colluvium and residuum derived dominantly from shale and siltstone. Slopes are 5 to 25 percent. Elevation is 8,400 to 9,300 feet. Average annual precipitation is 20 to 25 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are fine, montmorillonitic Mollic Cryoboralfs.

Typical pedon of a Hatch loam in an area of Hatch-Swapps complex, 5 to 25 percent slopes, in the SW¼SW¼ of sec. 35, T. 38 S., R. 4.5 W.

O1—0.5 inch to 0; conifer needles and twigs.

A—0 to 2 inches; light brown (7.5YR 6/4) loam, dark brown (7.5YR 3/3) moist; moderate thin platy structure parting to weak fine granular; slightly hard, very friable, nonsticky and nonplastic; common very fine roots and few fine and medium roots; few very fine pores; neutral (pH 6.6); abrupt wavy boundary.

Bt—2 to 9 inches; red (2.5YR 5/6) clay loam, red (2.5YR 4/8) moist; moderate medium angular blocky structure parting to moderate fine angular blocky; very hard, very firm, sticky and plastic; common very fine, fine, and medium roots and few coarse roots; few fine pores; many thin clay films on faces of peds; 5 percent fine pebbles; neutral (pH 6.6); clear smooth boundary.

Btk—9 to 23 inches; red (2.5YR 5/6) silty clay loam, red (2.5YR 4/6) moist; moderate coarse angular blocky structure parting to moderate medium angular blocky; very hard, firm, slightly sticky and plastic; common very fine, fine, and medium roots and few coarse roots; few fine pores; common thin clay films on faces of peds; 5 percent fine pebbles; strongly calcareous; neutral (pH 7.3); clear smooth boundary.

Bk—23 to 36 inches; red (2.5YR 5/6) silt loam, red (2.5YR 5/8) moist; massive; very hard, friable, slightly sticky and plastic; few very fine, fine, medium, and coarse roots; common very fine pores; 5 percent fine pebbles; strongly calcareous; mildly alkaline (pH 7.5); clear smooth boundary.

Cr—36 inches; light red (2.5YR 6/8) weathered platy siltstone.

Bedrock is at a depth of 20 to 38 inches.

The A horizon has hue of 5YR or 7.5YR, value of 3 to 6 when dry and 2 or 3 when moist, and chroma of 2 to 4 when dry.

The Bt horizon has hue of 2.5YR to 7.5YR. It is silty clay loam or clay loam and has 35 to 40 percent clay.

The Bk horizon has hue of 2.5YR to 7.5YR. It is silt loam or gravelly silt loam.

Henrieville Series

The Henrieville series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from sandstone, limestone, and shale. Slopes are 1 to 10 percent. Elevation is 6,000 to 7,200 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are coarse-loamy, mixed (calcareous), mesic Ustic Torriorthents.

Typical pedon of Henrieville sandy loam, 1 to 2 percent slopes, about 1,500 feet west and 1,300 feet south of the northeast corner of sec. 6, T. 37 S., R. 2 W.

A—0 to 12 inches; light brownish gray (2.5Y 6/2) sandy loam, grayish brown (2.5Y 5/2) moist; weak fine granular structure; soft, very friable; common fine and medium roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.3); clear smooth boundary.

C1—12 to 30 inches; light brownish gray (2.5Y 6/2) sandy loam, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; slightly hard, very friable; common fine and medium roots; few fine and medium pores; strongly calcareous; moderately alkaline (pH 8.3); clear smooth boundary.

C2—30 to 53 inches; light gray (2.5Y 7/2) sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable; few fine roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.3); clear smooth boundary.

C3—53 to 60 inches; light gray (2.5Y 7/2) loamy sand, grayish brown (2.5Y 5/2) moist; single grain; loose; few fine roots; few fine pores; strongly calcareous; moderately alkaline (pH 8.3).

Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 2.5Y or 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 2 or 3.

The C horizon has value of 5 to 7 when dry and 4 or 5 when moist, and it has chroma of 2 or 3. It is dominantly sandy loam or loam, but layers of loamy sand are below a depth of 40 inches. Carbonate equivalent is 15 to 40 percent.

Hernandez Family

The Hernandez Family consists of very deep, well drained soils on fan terraces. These soils formed in alluvium derived dominantly from sandstone and limestone. Slopes are 2 to 4 percent. Elevation is 6,300 to 7,200 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine-loamy, mixed, mesic Ustollic Calciorthids.

Typical pedon of a Hernandez Family loam in an area of Hernandez Family-Clapper complex, 2 to 8 percent slopes, about 1 mile south of Tropic, about 200 feet north and 175 feet west of the southeast corner of sec. 3, T. 37 S., R. 3 W.

A—0 to 3 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine pores; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary.

Bw—3 to 17 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots and few medium roots; few very fine, fine, and medium pores; moderately calcareous; carbonates are disseminated; moderately alkaline; (pH 8.3); clear smooth boundary.

Bk—17 to 30 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; common very fine roots and few fine and medium roots; few very fine and fine pores; strongly calcareous; carbonates are in soft masses; moderately alkaline (pH 8.2); gradual wavy boundary.

C—30 to 60 inches; reddish yellow (7.5YR 6/6) clay loam, strong brown (7.5YR 5/6) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few fine pores; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.2).

Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 10 to 17 inches.

The A horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 2 or 3. It is slightly calcareous or moderately calcareous.

The Bw horizon is absent in some pedons.

The Bk and C horizons have hue of 7.5YR or 10YR, value of 6 or 7 when dry and 5 or 6 when moist, and chroma of 3 to 6. Clay content is 28 to 35 percent. Rock fragment content is 0 to 5 percent.

Hoodle Series

The Hoodle series consists of very deep, well drained soils on dissected pediments veneered with volcanic alluvium. These soils formed in colluvium and residuum derived dominantly from intermediate volcanic rock. Slopes are 5 to 10 percent. Elevation is 8,500 to 10,000 feet. Average annual precipitation is 18 to 25 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are loamy-skeletal, mixed Argic Cryoborolls.

Typical pedon of Hoodle gravelly loam in an area of Winnemucca-Hoodle association, 5 to 30 percent slopes; in the NE¼ of sec. 28, T. 31 S., R. 2.5 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; many very fine interstitial pores; 25 percent pebbles; neutral (pH 6.7); gradual smooth boundary.

A2—2 to 9 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and nonplastic; many fine and very fine roots; common fine interstitial pores; 20 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bt1—9 to 13 inches; brown (10YR 4/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine and few medium roots; few fine interstitial and tubular pores; few thin clay bridges between sand grains; 25 percent pebbles and 10 percent cobbles; slightly acid (pH 6.5); clear wavy boundary.

Bt2—13 to 19 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; common very fine and few medium roots; common fine tubular and few coarse interstitial pores; few thin clay films on faces of peds and in pores; 50 percent cobbles and 5 percent pebbles; neutral (pH 7.0) gradual wavy boundary.

Bt3—19 to 27 inches; yellowish brown (10YR 5/4) extremely cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and nonplastic; few very fine and medium roots; common medium and coarse interstitial pores; few thin clay films in pores; 60 percent cobbles and 5 percent pebbles; slightly calcareous; moderately alkaline (pH 7.8); clear wavy boundary.

Bk—27 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few very fine roots; few medium and coarse interstitial pores; 65 percent cobbles and 10 percent pebbles; thin coating of hard carbonates on underside of rock fragments; common large white (10YR 8/2) weakly cemented fragments of a carbonate pan, light gray (10YR 7/2) moist; strongly calcareous; moderately alkaline (pH 7.8).

The mollic epipedon is 10 to 15 inches thick. Bedrock is at a depth of 60 inches or more.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3.

The Bt1 and Bt2 horizons have hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4. They are very gravelly sandy clay loam or very cobbly sandy clay loam. Rock fragment content is 35 to 50 percent.

The Bt3 and Bk horizons have hue of 7.5YR or 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 3 or 4.

Ipson Series

The Ipson series consists of very deep, well drained soils on mountainsides, hillsides, and fan terraces. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 5 to 60 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are loamy-skeletal, mixed Aridic Argiborolls.

Typical pedon of Ipson cobbly loam, 8 to 25 percent slopes, about 1,600 feet west and 1,600 feet south of the northeast corner of sec. 16, T. 31 S., R. 3 W.

A—0 to 6 inches; brown (10YR 5/3) cobbly loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium pores; 10 percent pebbles, 15 percent cobbles, and 5 percent stones; neutral (pH 7.3); clear smooth boundary.

Bt—6 to 14 inches; brown (10YR 4/3) very cobbly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine and medium pores; few thin clay films; 25 percent pebbles and 15 percent cobbles; mildly alkaline (pH 7.4); abrupt smooth boundary.

Bk1—14 to 25 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; weakly cemented; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots, few fine pores; 25 percent pebbles and 10 percent cobbles; strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

Bk2—25 to 36 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; 25 percent pebbles and 10 percent cobbles; very strongly calcareous; strongly alkaline (pH 8.8); clear wavy boundary.

C—36 to 60 inches; light gray (10YR 7/2) very gravelly sand, dark grayish brown (10YR 4/2) moist; single grain; loose; few fine roots; few fine pores; 40 percent pebbles and 20 percent cobbles; moderately calcareous; moderately alkaline (pH 8.4).

Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 10 to 16 inches. The mollic epipedon is 10 to 12 inches thick. The solum is 10 to 16 inches thick.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3. It is cobbly loam, very cobbly loam, or very stony loam. Reaction is neutral or mildly alkaline.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4. It is very cobbly loam or very cobbly clay loam. Clay content is 20 to 35 percent.

The Bk horizon has hue of 10YR or 7.5YR, value of 6 or 7 when dry and 5 or 6 when moist, and chroma of 2 to 4. It is very gravelly sandy loam, very cobbly loam, or very gravelly loam. Rock fragment content is 35 to 55 percent. The horizon is strongly calcareous or very strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

The C horizon has hue of 10YR or 7.5YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 2 or 3. It is very gravelly sand, very cobbly sandy loam, or very cobbly loam. Rock fragment content is 40 to 55 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Jodero Series

The Jodero series consists of very deep, well drained soils on alluvial fans and valley plains. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock and mixed sedimentary rock. Slopes are 1 to 8 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed Cumulic Haploborolls.

Typical pedon of Jodero loam, 1 to 2 percent slopes, about 0.5 mile east of Panguitch, in the SW¼ of sec. 8, T. 34 S., R. 5 W.

11—0 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; strong medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and few coarse roots; common fine and few coarse pores; neutral (pH 7.2); clear smooth boundary.

12—10 to 28 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few coarse roots; common fine pores; slightly calcareous; mildly alkaline (pH 7.4); clear smooth boundary.

1—28 to 34 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; few fine pores; 10 percent pebbles; slightly calcareous; mildly alkaline (pH 7.4); gradual wavy boundary.

2—34 to 60 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine pores; slightly calcareous; mildly alkaline (pH 7.4).

The mollic epipedon is 40 to 60 inches thick or more. drock is at a depth of 60 inches or more. The particle e control section is 0 to 10 percent rock fragments.

The A horizon has value of 2 or 3 when moist, and it s chroma of 2 or 3. It is noncalcareous to moderately careous. Reaction is neutral or mildly alkaline.

The C horizon has value of 4 to 6 when dry and 2 to 4 when moist, and it has chroma of 2 or 3. It is mildly alkaline to strongly alkaline.

Kade Series

The Kade series consists of very deep, poorly drained soils on flood plains and in valleys. These soils formed in mixed alluvium derived dominantly from limestone, sandstone, and shale. Slopes are 0 to 2 percent. Elevation is 7,600 to 8,200 feet. Average annual precipitation is 14 to 18 inches, and average annual temperature is 35 to 42 degrees F.

These soils are fine, mixed (calcareous) Typic Cryaquents.

Typical pedon of Kade silt loam, 0 to 2 percent slopes, 300 yards southeast of Daves Hollow Guard Station, in the SW¼ of sec. 14, T. 36 S., R. 4 W.

A1—0 to 2 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist and crushed; moderate medium to thin platy structure parting to moderate fine and very fine granular; loose, friable, slightly sticky and plastic; many medium and very fine roots; few fine and very fine pores; strongly calcareous; moderately alkaline (pH 7.8); abrupt smooth boundary.

A2—2 to 10 inches; light yellowish brown (10YR 6/4) silt loam, yellowish brown (10YR 5/4) moist and crushed; moderate thin platy structure parting to moderate fine and very fine granular; slightly hard, friable, sticky and plastic; many medium to very fine roots; few fine pores; strongly calcareous; moderately alkaline (pH 7.8); abrupt wavy boundary.

C1—10 to 20 inches; light brownish gray (10YR 6/2) silty clay, grayish brown (10YR 5/2) moist and crushed; common distinct brownish yellow (10YR 6/6) mottles; moderate thin platy structure parting to moderate fine and very fine subangular blocky; hard, friable, sticky and plastic; many fine and very fine roots; few medium and very fine roots and common fine pores; strongly calcareous; moderately alkaline (pH 8.2); clear wavy boundary.

C2—20 to 32 inches; light brownish gray (10YR 6/2) silty clay, grayish brown (10YR 5/2) moist and crushed; common distinct brownish yellow (10YR 6/6) mottles; strong medium platy structure parting to moderate fine and very fine angular blocky; hard, friable, sticky and plastic; few fine roots; common fine and very fine pores; strongly calcareous; moderately alkaline (pH 8.2); abrupt wavy boundary.

C3g—32 to 40 inches; gray (10YR 6/1) silt loam, very dark gray (10YR 3/1) moist and crushed; common distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure parting to moderate fine and very fine subangular blocky; hard, friable, slightly sticky and plastic; few fine and very fine roots; few fine and very fine pores; strongly calcareous, moderately alkaline (pH 8.2); abrupt wavy boundary.

C4g—40 to 60 inches; grayish brown (10YR 5/2) clay loam, very dark gray (10YR 3/1) moist and crushed; moderate medium subangular blocky structure parting to moderate fine and very fine subangular blocky; hard, friable, sticky and plastic; few fine and very fine roots; common fine and very fine pores; strongly calcareous, moderately alkaline (pH 8.2).

Bedrock is at a depth of 60 inches or more. The 10- to 40-inch particle size control section is more than 35 percent clay. Depth to a water table is 12 to 36 inches in most years.

The A horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 3 or 4.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 1 or 2. It is stratified silty clay, silt loam, clay loam, or very fine sandy loam.

Lazear Series

The Lazear series consists of shallow, well drained soils on mesas and mountainsides. These soils formed in residuum derived dominantly from sandstone. Slopes are 8 to 20 percent. Elevation is 6,300 to 7,200 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents.

Typical pedon of a Lazear gravelly sandy loam in an area of Lazear-Rock outcrop-Badland complex, 8 to 20 percent slopes, about 5.5 miles northeast of Henrieville, about 700 feet north and 300 feet west of the southeast corner of sec. 31, T. 37 S., R. 1 W.

A—0 to 3 inches; pale brown (10YR 6/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and few fine pores; 25 percent pebbles and 5 percent cobbles; slightly calcareous; carbonates are disseminated; mildly alkaline (pH 7.6); abrupt smooth boundary.

C—3 to 14 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common very fine and few fine pores; slightly calcareous; mildly alkaline (pH 7.6).

R—14 inches; sandstone.

Bedrock is at a depth of 10 to 20 inches. The particle size control section is 0 to 5 percent rock fragments.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 3 or 4. Rock fragment content is 15 to 30 percent. The horizon is slightly calcareous or moderately calcareous.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry, and chroma of 3 or 4. It is loam or clay loam. Clay content is 18 to 27 percent. Rock fragment content is 0 to 5 percent. The horizon is slightly calcareous or moderately calcareous. Reaction is mildly alkaline or moderately alkaline.

Losee Series

The Losee series consists of very deep, well drained soils on dissected alluvial fans and mountainsides. These soils formed in alluvium and colluvium derived dominantly from limestone, sandstone, and shale. Slopes are 3 to 60 percent. Elevation is 8,000 to 8,950 feet. Average annual precipitation is 14 to 20 inches, and average annual air temperature is 37 to 41 degrees F.

These soils are loamy-skeletal, mixed Typic Cryochrepts.

Typical pedon of Losee gravelly loam, 3 to 15 percent slopes, in the Crawford Creek drainageway, in the NW¼SW¼ of sec. 6, T. 39 S., R. 4 W.

A—0 to 4 inches; reddish brown (5YR 4/4) gravelly loam, dark reddish brown (5YR 3/3) moist; weak thin platy structure parting to weak fine granular; slightly hard, friable, nonsticky and slightly plastic; common very fine roots and few fine and medium roots; few fine pores; 15 percent pebbles; mildly alkaline (pH 7.5); clear smooth boundary.

Bw1—4 to 9 inches; reddish brown (5YR 4/4) gravelly clay loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common very fine, fine, and medium roots and few coarse roots; few fine pores; 15 percent pebbles and 5 percent cobbles; slightly calcareous in spots; mildly alkaline (pH 7.4); clear smooth boundary.

Bw2—9 to 17 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak fine and medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine, fine, and medium roots and few coarse roots; few fine pores; 30 percent pebbles and 20 percent cobbles; slightly calcareous; mildly alkaline (pH 7.7); abrupt smooth boundary.

C1—17 to 32 inches; reddish yellow (5YR 6/8) extremely gravelly loam, yellowish red (5YR 5/6) moist and crushed; massive; hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few very fine and fine pores; 75 percent pebbles and 10 percent cobbles; very strongly calcareous; mildly alkaline (pH 7.6); abrupt smooth boundary.

C2—32 to 60 inches; reddish yellow (5YR 6/8) extremely gravelly loam, yellowish red (5YR 5/8) moist; massive; very hard, friable, nonsticky and slightly plastic; few medium roots with several lenses of root mat; many very fine and fine pores; 75 percent pebbles and 10 percent cobbles; very strongly calcareous; mildly alkaline (pH 7.6).

The particle size control section averages 35 to 70 percent rock fragments. Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4. It is gravelly loam, very gravelly loam, or gravelly sandy loam.

The B horizon has hue of 5YR or 7.5YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 4 to 6. It is gravelly clay loam, very cobbly clay loam, or very gravelly sandy clay loam.

The C horizon has hue of 5YR or 7.5YR, value of 4 to 8 when dry and 4 to 6 when moist, and chroma of 2 to 8. It is extremely gravelly loam or extremely cobbly loam.

Luhon Series

The Luhon series consists of very deep, well drained soils on dissected alluvial fans and fan terraces. These soils formed in alluvium derived dominantly from mixed edimentary and igneous rock. Slopes are 1 to 15 ercent. Elevation is 6,500 to 7,500 feet. Average nnual precipitation is 10 to 14 inches, and average nnual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed Borollic Calciorthids.

Typical pedon of Luhon loam, moist, 3 to 15 percent slopes, about 1.5 miles northeast of Tom Best Springs, about 2,400 feet west and 1,700 feet south of the northeast corner of sec. 24, T. 34 S., R. 3 W.

A—0 to 6 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/3) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine roots; few medium and coarse pores; 2 percent pebbles; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); clear smooth boundary.

Bw—6 to 12 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine pores and few medium pores; 5 percent pebbles; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); clear smooth boundary.

Bk1—12 to 17 inches; pinkish white (7.5YR 8/2) loam, light brown (7.5YR 6/4) moist; weak fine subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; few very fine and fine pores; 5 percent pebbles; strongly calcareous; carbonates are in soft masses and veins; strongly alkaline (pH 8.6); clear wavy boundary.

Bk2—17 to 41 inches; pink (7.5YR 7/4) loam, brown (7.5YR 5/4) moist; massive; hard, firm, sticky and plastic; few very fine and fine roots; common very fine and fine pores; 2 percent pebbles; strongly calcareous; carbonates are in veins and flecks; strongly alkaline (pH 8.6); clear wavy boundary.

C—41 to 60 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; massive; hard, firm, sticky and plastic; few fine roots; few very fine and fine pores; 10 percent pebbles and 2 percent cobbles; strongly calcareous; carbonates are disseminated; strongly alkaline (pH 8.8).

Secondary carbonates are at a depth of 10 to 29 inches. The particle size control section is 0 to 30 percent rock fragments. Bedrock is at a depth of 60 inches or more. The B horizon is absent in some pedons.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4. It is loam, very cobbly sandy loam, or very cobbly loam. Rock fragment content is 0 to 45 percent. The horizon is moderately calcareous or strongly calcareous.

The Bw horizon has hue of 7.5YR or 10YR, value of

5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4. It is loam or gravelly loam. Clay content is 18 to 27 percent. Rock fragment content is 5 to 30 percent. The horizon is moderately calcareous or strongly calcareous.

The Bk horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 4 to 7 when moist, and chroma of 2 to 4. It is dominantly loam, sandy loam, gravelly loam, gravelly sandy loam, or cobbly loam; it is very cobbly sandy loam below a depth of 40 inches in some pedons. Rock fragment content is 0 to 50 percent. The horizon is strongly calcareous or very strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Mespun Series

The Mespun series consists of very deep, excessively drained soils on windblown hills, undulating benches, and dissected alluvial fans. These soils formed in eolian material derived from sandstone. Slopes are 1 to 15 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are mixed, mesic Ustic Torripsamments.

Typical pedon of Mespun loamy fine sand, 1 to 3 percent slopes, southwest of Boulder, Utah; about 2,400 feet north and 2,200 feet west of southeast corner of sec. 31, T. 33 S., R. 5 E.

Ap—0 to 6 inches; brown (7.5YR 5/4) loamy fine sand, dark brown (7.5YR 4/4) moist; single grain; loose; common medium roots and many fine and very fine roots; few medium vesicular pores and many fine and very fine vesicular pores; mildly alkaline (pH 7.6); clear smooth boundary.

C1—6 to 16 inches; strong brown (7.5YR 5/6) loamy fine sand, strong brown (7.5YR 4/6) moist; single grain; loose; many fine and very fine roots; many fine and very fine vesicular pores; mildly alkaline (pH 7.8); gradual smooth boundary.

C2—16 to 47 inches; strong brown (7.5YR 5/6) loamy fine sand, strong brown (7.5YR 4/6) moist; single grain; loose; common fine and very fine roots; many fine and very fine vesicular pores; mildly alkaline (pH 7.7); gradual smooth boundary.

C3—47 to 60 inches; reddish yellow (7.5YR 6/6) loamy fine sand, strong brown (7.5YR 5/6) moist; single grain; loose; few fine and very fine roots; many fine and very fine vesicular pores; mildly alkaline (pH 7.7).

Bedrock is at a depth of 60 inches or more.

The A horizon has value of 5 or 6 when dry and 4 or 5 when moist, and it has chroma of 4 or 5.

The C horizon has value of 5 or 6 when dry and 4 or 5 when moist, and it has chroma of 4 to 6. It is slightly calcareous in some pedons. Clay content is 3 to 8 percent.

Mikim Series

The Mikim series consists of very deep, well drained soils on dissected alluvial fans, benches, and fan terraces. These soils formed in alluvium derived dominantly from sandstone and shale. Slopes are 1 to 8 percent. Elevation is 6,000 to 7,200 feet. Average annual precipitation is 10 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine-loamy, mixed (calcareous), mesic Ustic Torriorthents.

Typical pedon of Mikim sandy loam, 2 to 8 percent slopes, about 1,050 feet north and 1,050 feet east of the southwest corner of sec. 4, T. 37 S., R. 2 W.

A—0 to 5 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common fine and medium pores; strongly calcareous; moderately alkaline (pH 8.3); abrupt smooth boundary.

C1—5 to 14 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderately coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few fine, medium, and coarse pores; strongly calcareous; strongly alkaline (pH 8.5); gradual wavy boundary.

C2—14 to 29 inches; light brownish gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; extremely hard, firm, sticky and plastic; few fine, medium, and coarse roots; few fine and medium pores; strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

C3—29 to 42 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; extremely hard, firm, sticky and plastic; few medium pores; strongly calcareous; strongly alkaline (pH 9.0); gradual wavy boundary.

C4—42 to 60 inches; very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; strong coarse prismatic structure parting to moderate medium subangular blocky; extremely hard, firm, sticky and plastic; few medium pores; strongly calcareous; strongly alkaline (pH 9.0).

Bedrock is at a depth of 60 inches or more.

The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 to 4. It is sandy loam, loam, or clay loam. Reaction is mildly alkaline or moderately alkaline.

The C horizon has value of 6 or 7 when dry and 4 or 5 when moist, and it has chroma of 2 or 3. It is loam, sandy clay loam, or clay loam. Clay content is 18 to 35 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Mitch Series

The Mitch series consists of very deep, well drained soils on bottom lands and flood plains. These soils formed in mixed alluvium derived dominantly from intermediate volcanic rock. Slopes are 0 to 3 percent. Elevation is 6,900 to 8,300 feet. Average annual precipitation is 10 to 16 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are fine-silty, mixed Cumulic Haploborolls.

Typical pedon of Mitch silt loam, 0 to 3 percent slopes, about 500 feet north and 500 feet west of the southeast corner of sec. 32, T. 33 S., R. 2 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) silt loam, dark brown (10YR 3/3) moist; weak thick platy structure parting to weak very fine granular; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many fine interstitial pores; slightly calcareous; mildly alkaline (pH 7.8); abrupt smooth boundary.

A2—2 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; very soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine interstitial pores; slightly calcareous; mildly alkaline (pH 7.5); clear smooth boundary.

Bw1—4 to 26 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few very fine tubular pores; strongly calcareous; mildly alkaline (pH 7.5); clear wavy boundary.

Bw2—26 to 29 inches; grayish brown (10YR 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; few medium and very fine roots; common fine interstitial pores; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

Bw3—29 to 44 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

C—44 to 60 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; soft, friable, nonsticky and nonplastic; few fine tubular and interstitial pores; 5 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.2).

The mollic epipedon is 24 to 48 inches thick. The particle size control section averages less than 15 percent sand that is coarser than very fine sand. Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 1 to 3.

The Bw and C horizons have hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 1 to 3. They are stratified loam, silt loam, or very fine sandy loam.

Mivida Series

The Mivida series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvial and eolian material derived dominantly from sandstone. Slopes are 2 to 10 percent. Elevation is 6,000 to 6,400 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are coarse-loamy, mixed, mesic Ustollic Calciorthids.

Typical pedon of Mivida fine sandy loam, 2 to 10 percent slopes, about 0.25 mile southwest of the Escalante River in Escalante, 1,900 feet north and 2,300 feet west of the southeast corner of sec. 18, T. 35 S., R. 3 E.

A—0 to 4 inches; brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; weak medium and thick platy structure parting to weak fine granular;

soft, very friable; few medium, fine, and very fine roots; common fine and very fine vesicular and interstitial pores; slightly calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

Bw—4 to 13 inches; strong brown (7.5YR 5/6) fine sandy loam, strong brown (7.5YR 4/5) moist; weak coarse subangular blocky structure; soft, very friable; few medium roots and common fine and very fine roots; few fine and common very fine tubular pores; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); clear smooth boundary.

Bk—13 to 41 inches; light brown (7.5YR 6/4) fine sandy loam, strong brown (7.5YR 4/6) moist; massive; hard, friable; few fine and very fine roots; few fine and very fine tubular pores; strongly calcareous; carbonates are in veins and filaments; strongly alkaline (pH 8.6); gradual smooth boundary.

C1—41 to 50 inches; strong brown (7.5YR 5/6) fine sandy loam, strong brown (7.5YR 4/5) moist; massive; soft, friable, slightly sticky and slightly plastic; few fine and very fine roots; few fine tubular pores; moderately calcareous; carbonates are disseminated; strongly alkaline (pH 8.8); clear smooth boundary.

C2—50 to 60 inches; yellowish red (5YR 5/6) fine sandy loam, reddish brown (5YR 4/4) moist; massive; soft, friable, slightly sticky and slightly plastic; few fine and very fine roots; few fine tubular pores; moderately calcareous; carbonates are disseminated; strongly alkaline (pH 8.8).

Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 7.5YR or 5YR, value of 4 or 5 when dry, and chroma of 4 to 6.

The Bw horizon has hue of 5YR or 7.5YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 4 to 6.

The Bk horizon has hue of 5YR or 7.5YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 4 to 6. It is loamy fine sand to loam. Reaction is moderately alkaline or strongly alkaline.

The C horizon has hue of 5YR or 7.5YR, value of 5 or 6 when dry and 4 to 6 when moist, and chroma of 4 to 6. It is moderately alkaline or strongly alkaline.

Neto Series

The Neto series consists of very deep, moderately well drained to somewhat excessively drained soils on alluvial fans and valley bottoms. These soils formed in mixed alluvium derived dominantly from sandstone, limestone, and shale. Slopes are 0 to 5 percent. Elevation is 6,500 to 8,200 feet. Average annual precipitation is 10 to 18 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are coarse-loamy, mixed (calcareous), frigid Typic Ustifluvents.

Typical pedon of a Neto sandy loam in an area of Frandsen-Neto association, 1 to 8 percent slopes, in Noon Canyon, in the SE¼ of sec. 26, T. 37 S., R. 4 W.

A—0 to 2 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common fine roots; common fine interstitial pores; 2 percent pebbles; strongly calcareous; moderately alkaline (pH 8.0); clear smooth boundary.

C1—2 to 13 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable; common fine and very fine roots; few fine interstitial pores and common fine tubular pores; strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

C2—13 to 16 inches; light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 5/4) moist; single grain; loose; common very fine and few coarse roots; common medium interstitial pores; 50 percent fine pebbles; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

C3—16 to 28 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable; few fine roots; 2 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

C4—28 to 38 inches; pale brown (10YR 6/3) loamy sand, yellowish brown (10YR 5/4) moist; massive; soft, friable; 5 percent pebbles; strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

C5—38 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; single grain; loose; 75 percent medium and coarse pebbles; strongly calcareous; moderately alkaline (pH 8.0).

The particle size control section averages less than 18 percent clay and less than 35 percent rock fragments. Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 7.5YR to 2.5Y, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 3 to 6. It is sandy loam, fine sandy loam, or very fine sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 6 when moist, and chroma of 3 to 6. It is stratified loam, sandy loam, fine sandy loam, very fine sandy loam, loamy sand, silt loam, silty clay loam, very gravelly loamy sand, or extremely gravelly loamy sand.

Notter Series

The Notter series consists of very deep, well drained soils on dissected alluvial fans, narrow valley plains, foothills, and mountainsides. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 1 to 25 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed Aridic Argiborolls.

Typical pedon of Notter gravelly coarse sandy loam, 2 to 8 percent slopes, about 1,320 feet east and 1,600 feet north of the southwest corner of sec. 30, T. 32 S., R. 4 W.

A—0 to 3 inches; brown (7.5YR 5/3) gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable; many fine roots; few fine tubular pores; 25 percent pebbles; neutral (pH 7.0); abrupt smooth boundary.

Bt1—3 to 7 inches; brown (7.5YR 5/3) gravelly sandy clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium tubular pores; few thin clay films; 25 percent pebbles; neutral (pH 7.2); clear smooth boundary.

Bt2—7 to 15 inches; brown (7.5YR 5/3) gravelly sandy clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium tubular pores; few thin clay films; 25 percent pebbles; neutral (pH 7.2); clear smooth boundary.

Bw—15 to 22 inches; brown (7.5YR 5/3) very gravelly loam, brown (7.5YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium tubular pores; 30 percent pebbles and 5 percent cobbles; slightly calcareous; mildly alkaline (pH 7.4); clear smooth boundary.

Bk1—22 to 37 inches; light gray (10YR 7/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable; common fine and few medium roots; common fine interstitial pores; 40 percent pebbles; strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

Bk2—37 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable; common fine roots; common fine interstitial pores; 60 percent pebbles; strongly calcareous; strongly alkaline (pH 8.8).

Bedrock is at a depth of 60 inches or more. Secondary carbonates are at a depth of 9 to 23 inches. The mollic epipedon is 7 to 15 inches thick. The particle size control section is 5 to 35 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. It is loam, gravelly coarse sandy loam, gravelly loam, or very cobbly loam. Rock fragment content is 20 to 60 percent. Reaction is neutral or mildly alkaline.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4. It is gravelly loam, gravelly sandy clay loam, gravelly clay loam, clay loam, or loam. Clay content is 18 to 30 percent. Rock fragment content is 5 to 35 percent. Reaction is neutral to moderately alkaline.

The Bk horizon and the C horizon, if it occurs, have hue of 7.5YR or 10YR, value of 6 to 8 when dry and 3 to 6 when moist, and chroma of 1 to 3 when dry or moist. They are very gravelly sandy loam, very gravelly sand, gravelly sandy loam, or very gravelly loam. Rock fragment content is 15 to 70 percent. Textures coarser than sandy loam are at a depth of more than 5 inches below the Bt horizon. Some horizons are weakly cemented. Reaction is moderately alkaline or strongly alkaline.

Notter Variant

The Notter Variant consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 1 to 4 percent. Elevation is 6,500 to 7,200 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy over sandy or sandy-skeletal, mixed Cumulic Haploborolls.

Typical pedon of Notter Variant loam, 1 to 4 percent slopes, on the eastern edge of Panguitch, in the SW¼ of sec. 28, T. 34 S., R.5 W.

A—0 to 8 inches; brown (7.5YR 5/2) loam, dark brown

(7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; many very fine tubular pores; 5 percent pebbles; slightly calcareous; moderately alkaline (pH 8.2); clear smooth boundary.

Bw—8 to 19 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine and medium tubular pores; 5 percent pebbles; slightly calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

C1—19 to 24 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; 10 to 15 percent pebbles; slightly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

2C2—24 to 60 inches; grayish brown (10YR 5/2) extremely cobbly sand, very dark brown (10YR 2/2) moist; single grain; loose; few fine roots; 30 percent pebbles and 40 percent cobbles; slightly calcareous; moderately alkaline (pH 8.4).

The mollic epipedon is 19 to 60 inches thick. Bedrock is at a depth of 60 inches or more. Depth to the 2C horizon is 20 to 25 inches.

The A horizon has hue of 7.5YR or 10YR, and it has value of 4 or 5 when dry and 2 or 3 when moist. It is noncalcareous or slightly calcareous. Reaction is mildly alkaline or moderately alkaline.

The Bw and C horizons have value of 4 or 5 when dry and 2 or 3 when moist and chroma of 2 or 3. They are noncalcareous or slightly calcareous. The horizons are 18 to 25 percent clay and 0 to 10 percent pebbles.

The 2C horizon is extremely cobbly sand or extremely gravelly sand. It is 35 to 70 percent rock fragments.

Osote Series

The Osote series consists of very deep, well drained soils on alluvial fans and toe slopes. These soils formed in alluvium and colluvium derived from limestone and sandstone. Slopes are 3 to 15 percent. Elevation is 7,600 to 8,400 feet. Average annual precipitation is 14 to 18 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed Fluventic Haploborolls.

Typical pedon of an Osote silty clay loam in an area of Ahlstrom-Osote complex, 1 to 15 percent slopes, in Daves Hollow, in the NE¼SE¼ of sec. 26, T. 36 S., R. 4 W.

A1—0 to 3 inches; brown (10YR 5/3) silty clay loam, dark brown (7.5YR 3/2) moist and crushed; moderate fine platy structure parting to moderate fine granular; soft, friable, slightly sticky and slightly plastic; many very fine and medium roots; common fine interstitial pores; 10 percent fine pebbles; slightly calcareous; mildly alkaline (pH 7.6); clear smooth boundary.

A2—3 to 9 inches; brown (7.5YR 5/3) silty clay loam, dark brown (7.5YR 3/2) moist and crushed; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; common medium and very fine roots; common very fine interstitial pores; strongly calcareous; mildly alkaline (pH 7.6); gradual smooth boundary.

Bw—9 to 20 inches; brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 3/4) moist and crushed; weak coarse and medium subangular blocky structure parting to moderate fine granular; slightly hard, firm, slightly sticky and plastic; common very fine, medium, and coarse roots; common very fine interstitial and tubular pores; very strongly calcareous; mildly alkaline (pH 7.6); clear wavy boundary.

Bk1—20 to 26 inches; light brown (7.5YR 6/4) silty clay loam, brown (7.5YR 4/4) moist and crushed; moderate coarse and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine, medium, and coarse roots; many fine and very fine pores; very strongly calcareous; mildly alkaline (pH 7.8); gradual wavy boundary.

Bk2—26 to 33 inches; yellowish red (5YR 5/6) silty clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; common fine tubular pores; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

2Bk3—33 to 37 inches; light reddish brown (5YR 6/4) very gravelly loam, reddish brown (5YR 5/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; few fine pores; 50 percent fine angular pebbles; very strongly calcareous; moderately alkaline (pH 7.9); abrupt wavy boundary.

2C1—37 to 47 inches; reddish yellow (5YR 6/6) very gravelly loam, yellowish red (5YR 5/6) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular pores; 35 percent fine angular pebbles; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

2C2—47 to 60 inches; reddish yellow (5YR 6/6) extremely cobbly loam, yellowish red (5YR 5/6) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few fine roots; few fine and coarse interstitial pores; 50 percent cobbles and 30 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.0).

The mollic epipedon is 9 to 15 inches thick. The solum is 16 to 27 inches thick. Depth to bedrock is estimated to be 5 to 15 feet.

The A horizon has hue of 5YR to 10YR, value of 4 or 5 when dry, and chroma of 2 or 3.

The Bw horizon has hue of 5YR or 7.5YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 4 to 6. It is loam, clay loam, or silty clay loam.

The Bk, 2Bk, and 2C horizons have hue of 5YR or 7.5YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 4 to 6. They are loam, very gravelly loam, or extremely cobbly loam.

Pahreah Series

The Pahreah series consists of moderately deep, well drained to somewhat excessively drained soils on colluvial side slopes of mesas and mountains. These soils formed in colluvium and residuum derived dominantly from limestone. Slopes are 1 to 65 percent. Elevation is 8,100 to 9,000 feet. Average annual precipitation is 13 to 25 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are loamy-skeletal, carbonatic Calcic Cryoborolls.

Typical pedon of a Pahreah very gravelly loam in an area of Pahreah-Swapps complex, 25 to 65 percent slopes, in the NE¼ of sec. 25, T. 38 S., R. 4.5 W.

O1—1 inch to 0; undecomposed and partly decomposed conifer needles and twigs.

A1—0 to 0.5 inch; brown (7.5YR 5/4) very gravelly loam, dark brown (10YR 3/3) moist and crushed; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; common very fine pores; 50 percent fine and medium pebbles; mildly alkaline (pH 7.6); clear smooth boundary.

A2—0.5 to 5.0 inches; brown (7.5YR 5/3) very gravelly loam, dark brown (7.5YR 3/3) moist and crushed; weak medium subangular blocky structure parting to weak very fine granular; soft, friable, nonsticky and slightly plastic; common very fine, fine, and medium roots and few coarse roots; few fine pores; 40 percent fine pebbles; strongly calcareous; mildly alkaline (pH 8.0); abrupt wavy boundary.

Bw—5 to 12 inches; brown (7.5YR 4/4) very gravelly loam, dark brown (7.5YR 3/3) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; few coarse roots; few fine pores; 40 percent fine pebbles; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk1—12 to 17 inches; pinkish white (7.5YR 8/2) extremely gravelly loam, light brown (7.5YR 6/4) moist; massive; very hard, firm, nonsticky and slightly plastic; few fine and medium roots in fractures; few fine and coarse interstitial pores; weakly cemented in some parts; precipitated carbonates on the bottom of pebbles; 70 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

Bk2—17 to 26 inches; pink (5YR 7/3) and pinkish white (5YR 8/2) extremely gravelly loam, light red (2.5YR 6/6) and pink (5YR 7/3) moist; massive; slightly hard, firm, nonsticky and slightly plastic; few fine, medium, and coarse roots in fractures; few fine tubular pores; very weakly cemented or weakly cemented; carbonates on the bottom of pebbles; 80 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk3—26 to 38 inches; pinkish white (7.5YR 8/2) extremely cobbly loam, pinkish gray (7.5YR 7/2) moist; massive; slightly hard, firm, nonsticky and nonplastic; few fine and coarse roots in fractures; coarse root channels filled with loam that is very dark brown (10YR 2/2) when moist; 70 percent cobbles and 20 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

R—38 inches; fractured limestone.

Bedrock is at a depth of 20 to 40 inches. The mollic epipedon is 7 to 16 inches thick. Depth to the calcic horizon is 10 to 20 inches. The particle size control section averages 35 to 90 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 to 4.

The Bw horizon has hue of 5YR to 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 to 4. It is very gravelly, cobbly, or very cobbly loam to very gravelly clay loam.

The Bk horizon has hue of 2.5YR or 5YR, value of 5 to 8 when dry and 4 to 6 when moist, and chroma of 2 to 8.

Panguitch Series

The Panguitch series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in mixed alluvium derived dominantly from intermediate volcanic rock. Slope is 2 to 15 percent. Elevation is 7,000 to 7,500 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are coarse-loamy, mixed Typic Haploborolls.

Typical pedon of a Panguitch gravelly loam in an area of Panguitch-Riverwash association, 5 to 15 percent slopes, in Lime Kiln Canyon; in the NW¼NW¼ of sec. 15, T. 34 S., R. 4.5 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) moist; weak thick platy structure parting to weak fine granular; soft, friable, nonsticky and nonplastic; few fine roots; many fine and medium vesicular pores; 25 percent pebbles; neutral (pH 7.0); abrupt smooth boundary.

A2—2 to 5 inches; brown (7.5YR 4/2) gravelly loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; few fine and medium roots; common fine interstitial pores; 20 percent pebbles; neutral (pH 7.0); clear smooth boundary.

Bw1—5 to 11 inches; brown (7.5YR 4/2) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and medium roots; common fine interstitial pores and few fine tubular pores; 20 percent pebbles; mildly alkaline (pH 7.5); gradual wavy boundary.

Bw2—11 to 26 inches; brown (7.5YR 5/2) gravelly sandy loam, dark brown (7.5YR 4/2) moist; weak medium and coarse subangular blocky structure; soft, friable, nonsticky and nonplastic; few very fine and medium roots; 25 percent pebbles and 5 percent cobbles; slightly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk1—26 to 47 inches; pink (7.5YR 7/4) and pinkish white (7.5YR 8/2) gravelly sandy loam, light brown (7.5YR 6/4) and pinkish gray (7.5YR 7/2) moist; massive; slightly hard, firm, nonsticky and nonplastic; few very fine roots; few fine interstitial and tubular pores; 25 percent pebbles and 5 percent cobbles coated with carbonates on the bottom; very strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk2—47 to 60 inches; light brown (7.5YR 6/4) and pinkish white (7.5YR 8/2) very gravelly loamy sand, brown (7.5YR 5/4) and pinkish gray (7.5YR 7/2) moist; massive; soft, friable, nonsticky and nonplastic; few fine and common coarse interstitial pores; 30 percent pebbles and 10 percent cobbles coated with carbonates on the bottom; very strongly calcareous; moderately alkaline (pH 8.2).

The mollic epipedon is 7 to 12 inches thick. The particle size control section averages 10 to 20 percent clay and 20 to 35 percent rock fragments. Depth to the Cca horizon ranges from 18 to 30 inches. Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. It is gravelly loam or gravelly sandy loam.

The Bw horizon has value of 4 to 6 when dry and 3 to 5 when moist, and it has chroma of 2 to 4. It is gravelly sandy loam or gravelly clay loam.

The Bk horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 5 to 7 when moist, and chroma of 2 to 4. It is gravelly sandy loam or very gravelly loamy sand.

Paunsaugunt Series

The Paunsaugunt series consists of shallow, well drained to somewhat excessively drained soils on mesas and hills. These soils formed in residuum derived from limestone and calcareous sandstone. Slopes are 2 to 15 percent. Elevation is 7,300 to 8,400 feet. Average annual precipitation is 16 to 22 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are loamy-skeletal, mixed Lithic Haploborolls.

Typical pedon of Paunsaugunt gravelly loam, 2 to 15 percent slopes, north of Utah State Highway 12, in the NW¼ of sec. 33, T. 35 S., R. 4 W.

A1—0 to 3 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist and crushed; weak thin platy vesicular surface crust over very fine granular structure; soft, friable, nonsticky and nonplastic; common fine and very fine roots; few fine interstitial pores; 30 percent pebbles; very strongly calcareous; mildly alkaline (pH 7.5); abrupt smooth boundary.

A2—3 to 8 inches; grayish brown (10YR 5/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist and crushed; weak medium subangular blocky structure parting to weak fine granular; soft, friable, nonsticky and nonplastic; common fine and medium roots; common fine and very fine interstitial pores; 35 percent cobbles; very strongly calcareous; mildly alkaline (pH 7.5); clear smooth boundary.

C—8 to 15 inches; light brownish gray (10YR 6/2) very cobbly sandy loam, dark brown (10YR 3/3) moist and crushed; weak fine subangular blocky structure parting to weak fine granular; soft, friable, nonsticky and nonplastic; many medium and coarse roots; few fine and very fine pores; 45 percent cobbles; very strongly calcareous; moderately alkaline (pH 7.7); abrupt wavy boundary.

R—15 inches; limestone.

The mollic epipedon is 7 to 12 inches thick. Bedrock is at a depth of 10 to 20 inches. The particle size control section averages 35 to 50 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 or 3.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 or 3. It is very gravelly sandy loam, very cobbly sandy loam, very gravelly loam, or very cobbly loam.

Plite Series

The Plite series consists of very deep, somewhat excessively drained soils on alluvial valley bottoms. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 2 to 8 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are coarse-loamy, mixed Cumulic Haploborolls.

Typical pedon of Plite sandy loam, 2 to 8 percent slopes, about 2.5 miles northeast of Bear Valley Junction, in the NE¼ of sec. 34, T. 32 S., R. 5 W.

A1—0 to 3 inches; brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure parting to single grain; soft, very friable; common fine and few medium roots; few fine and medium tubular pores; 5 percent pebbles; neutral (pH 7.2); abrupt smooth boundary.

A2—3 to 33 inches; brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable; few fine and medium roots; few fine and medium tubular pores; 5 percent pebbles; mildly alkaline (pH 7.4); gradual wavy boundary.

C—33 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; hard, very friable; few fine roots; few fine tubular pores; 5 percent pebbles; moderately calcareous; moderately alkaline (pH 8.4).

The mollic epipedon is 16 to 60 inches thick. Bedrock is at a depth of 60 inches or more.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3. Rock fragment content is 0 to 5 percent. Reaction is neutral or mildly alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 2 to 4, and chroma of 1 to 3. It is sandy loam or loam. Clay content is 10 to 18 percent. Rock fragment content is 0 to 5 percent. The horizon is noncalcareous or slightly calcareous. Reaction is mildly alkaline or moderately alkaline.

Podo Series

The Podo series consists of shallow, somewhat excessively drained soils on mountainsides, benches, and rolling hills. These soils formed in residuum and alluvium derived dominantly from sandstone, limestone, and shale. Slopes are 1 to 70 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 18 inches, and average annual air temperature is 38 to 44 degrees F.

These soils are loamy, mixed (calcareous), frigid Lithic Ustorthents.

Typical pedon of a Podo gravelly sandy loam in an area of Ruko-Podo complex, 15 to 60 percent slopes, in Ponderosa Canyon, in the SW¼ of sec. 9, T. 38 S., R. 4 W.

A1—0 to 2 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable; common fine roots; common very fine interstitial pores; 25 percent pebbles, 5 percent cobbles, and 2 percent stones; slightly calcareous; moderately alkaline (pH 8.0); clear smooth boundary.

A2—2 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, friable; common fine and very fine roots; common fine interstitial pores; 20

percent pebbles and 5 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

C1—6 to 12 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky; common very fine, medium, and coarse roots; few fine interstitial and tubular pores; 15 percent pebbles and 5 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

C2—12 to 19 inches; light yellowish brown (10YR 6/4) cobbly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, firm, slightly sticky; few very fine, medium, and coarse roots; few fine and medium interstitial pores; few large faint brown root channels; 25 percent cobbles and 10 percent pebbles; strongly calcareous; moderately alkaline (pH 8.2); abrupt wavy boundary.

R—19 inches; calcareous sandstone.

Bedrock is at a depth of 10 to 20 inches.

The A horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 3 to 6. It is gravelly sandy loam, loamy sand, channery sandy loam, or very gravelly loam. It is slightly calcareous to strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 4 or 5, and chroma of 2 to 4. It is sandy loam, loam, gravelly sandy loam, cobbly sandy loam, or gravelly loam. Rock fragment content is 5 to 30 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Quilt Series

The Quilt series consists of very deep, well drained soils on mountainsides, benches, low hills, and dissected alluvial fans. These soils formed in alluvium derived dominantly from mixed igneous rock. Slopes are 4 to 40 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are fine, montmorillonitic Typic Argiborolls.

Typical pedon of Quilt very cobbly loam, 4 to 25 percent slopes, about 6 miles south of Panguitch, about 2,000 feet north and 2,400 feet west of the southeast corner of sec. 29, T. 35 S., R. 5 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; few medium tubular pores and common very fine and fine tubular pores; 30 percent pebbles, 20 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.8); clear smooth boundary.

Bt1—4 to 10 inches; brown (7.5YR 4/2) cobbly clay, dark brown (7.5YR 3/2) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; few fine, medium, and coarse roots; common fine and few medium tubular pores; continuous moderately thick clay films; 10 percent pebbles and 10 percent cobbles; mildly alkaline (pH 7.6); clear smooth boundary.

Bt2—10 to 19 inches; brown (7.5YR 5/4) cobbly clay, dark brown (7.5YR 4/2) moist; strong coarse angular blocky structure; very hard, very firm, sticky and plastic; few fine and medium roots; common fine and few medium tubular pores; continuous moderately thick clay films; 10 percent pebbles and 10 percent cobbles; mildly alkaline (pH 7.6); clear smooth boundary.

Bt3—19 to 43 inches; brown (7.5YR 5/4) cobbly clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; very hard, firm, sticky and plastic; few fine roots; many fine tubular pores; few thin clay films; 15 percent pebbles and 10 percent cobbles; mildly alkaline (pH 7.6); clear wavy boundary.

C1—43 to 48 inches; grayish brown (10YR 5/2) gravelly sandy clay loam, brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; few fine roots; common fine tubular pores; 20 percent pebbles and 5 percent cobbles; slightly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

C2—48 to 60 inches; pinkish gray (7.5YR 6/2) gravelly coarse sandy loam, brown (7.5YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine interstitial pores; 20 percent pebbles and 10 percent cobbles; slightly calcareous; moderately alkaline (pH 8.0).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 10 to 16 inches thick. The solum is 40 to 60 inches thick. The particle size control section is 15 to 35 percent rock fragments.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 to 4. Reaction is neutral or mildly alkaline.

The Bt horizon has value of 4 to 6 when dry and 3 or 4 when moist, and it has chroma of 2 to 4. It is cobbly clay, cobbly clay loam, or gravelly clay loam. Clay content is 35 to 45 percent. Reaction is neutral or mildly alkaline.

The C horizon has hue of 10YR or 7.5YR, value of 5 to 8 when dry and 4 to 7 when moist, and chroma of 2 to 4. It is gravelly sandy clay loam or gravelly coarse sandy loam. Clay content is 10 to 25 percent. Rock fragment content is 15 to 35 percent. The horizon is noncalcareous to strongly calcareous. Reaction is mildly alkaline or moderately alkaline.

Redcreek Series

The Redcreek series consists of shallow, well drained soils on mountainsides, ridgetops, and fan terraces. These soils formed in residuum derived dominantly from mixed sedimentary and igneous rock. Slopes are 10 to 50 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are loamy, mixed (calcareous), frigid Lithic Ustic Torriorthents.

Typical pedon of Redcreek cobbly loam, 15 to 50 percent slopes, about 4.5 miles south of Antimony, in the NE¼SW¼ of sec. 34, T. 36 S., R. 3 W.

A—0 to 8 inches; brown (10YR 5/3) cobbly loam, dark brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and coarse roots; few fine pores; 3 percent stones, 10 percent cobbles, and 20 percent pebbles; slightly calcareous; moderately alkaline (pH 8.2); abrupt smooth boundary.

C—8 to 19 inches; light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky; few fine medium and coarse roots; few fine pores; 10 percent cobbles and 20 percent pebbles; moderately calcareous; moderately alkaline (pH 8.4).

R—19 inches; sandstone.

Bedrock is at a depth of 10 to 20 inches. The particle size control section is 8 to 18 percent clay and 5 to 30 percent rock fragments.

The A horizon is cobbly loam or gravelly sandy loam. Rock fragment content is 20 to 35 percent. The horizon is slightly calcareous or moderately calcareous. Reaction is mildly alkaline or moderately alkaline.

The C horizon is slightly calcareous to strongly calcareous. Reaction is mildly alkaline or moderately alkaline.

Ruko Series

The Ruko series consists of shallow, well drained soils on mountainsides. These soils formed in residuum derived dominantly from shale. Slopes are 30 to 60 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents.

Typical pedon of Ruko clay loam in an area of Ruko-Podo complex, 15 to 60 percent slopes, in Horse Hollow, in the NW¼ of sec. 11, T. 39 S., R. 4 W.

A—0 to 4 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine interstitial pores; 5 percent pebbles and 2 percent stones; strongly calcareous; moderately alkaline (pH 8.0); clear smooth boundary.

C1—4 to 7 inches; light gray (10YR 6/1) clay, gray (10YR 5/1) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common fine, medium, and coarse roots; few fine interstitial and tubular pores; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

C2—7 to 19 inches; light gray (10YR 6/1) clay, gray (10YR 5/1) moist; weak medium subangular blocky structure; very hard, very firm, sticky and plastic; few very fine, medium, and coarse roots; few fine interstitial and tubular pores; strongly calcareous; few fine faint white (10YR 8/1) carbonate segregations; moderately alkaline (pH 8.0); diffuse wavy boundary.

Cr—19 inches; shale.

Paralithic contact is at a depth of 10 to 20 inches.

The A horizon has hue of 2.5Y or 10YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 2 or 3. It is slightly calcareous to strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

The C horizon has hue of 2.5Y or 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 1 or 2. It is clay or clay loam. Clay content is 35 to 45 percent. The horizon is slightly calcareous to strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Schauson Series

The Schauson series consists of very deep, well drained soils on dissected alluvial fans and valley plains. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 2 to 15 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy, mixed Pachic Argiborolls.

Typical pedon of Schauson loam, 2 to 4 percent slopes, about 8 miles north of Bear Valley Junction, in the SE¼ of sec. 28, T. 31 S., R. 5 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, friable, slightly sticky; common fine and few medium roots; few fine pores; neutral (pH 7.0); clear smooth boundary.

Bt1—5 to 12 inches; dark brown (10YR 4/3) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; very hard, firm, slightly sticky and slightly plastic; common thin clay films on faces of peds; few fine and medium pores; neutral (pH 7.0); clear smooth boundary.

Bt2—12 to 25 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; very hard, firm, sticky and plastic; common thin clay films on faces of peds; few fine roots; few fine pores; neutral (pH 7.0); gradual wavy boundary.

BC—25 to 45 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; common fine and medium pores; mildly alkaline (pH 7.4); clear smooth boundary.

Btb—45 to 60 inches; yellowish brown (10YR 5/4) clay loam, dark grayish brown (10YR 4/2) moist; weak moderate angular blocky structure; hard, firm, sticky and plastic; common thin clay films on faces of peds; few fine roots; common fine and medium pores; mildly alkaline (pH 7.4).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 22 to 40 inches thick. The solum is 19 to 46 inches thick. The particle size control section averages 27 to 35 percent clay and 0 to 5 percent rock fragments. The Btb horizon is absent in some pedons.

The A horizon is neutral to moderately alkaline.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 to 4 when moist, and chroma of 2 to 4. It is sandy clay loam or clay loam. Reaction is neutral or mildly alkaline.

The BC horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 to 4. It is sandy clay loam to clay loam. Reaction is neutral to moderately alkaline.

Sevier Series

The Sevier series consists of moderately deep, moderately well drained soils on benches and toe slopes. These soils formed in residuum and colluvium derived dominantly from sandstone and shale. Slopes are 5 to 25 percent. Elevation is 7,900 to 8,500 feet. Average annual precipitation is 18 to 20 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are fine, mixed Argic Cryoborolls.

Typical pedon of a Sevier very fine sandy loam in an area of Sevier-Skutum association, 5 to 35 percent slopes, near Podunk Creek, in the NW¼SW¼ of sec. 13, T. 38 S., R. 4.5 W.

A1—0 to 4 inches; brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3) moist and crushed; weak very thin platy structure parting to weak fine granular; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common fine pores; neutral (pH 7.0); clear smooth boundary.

A2—4 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist and crushed; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine pores; neutral (pH 7.0); clear smooth boundary.

Bt—9 to 15 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 3/3) moist and crushed; moderate medium angular blocky structure parting to moderate fine angular blocky; extremely hard, very firm, sticky and plastic; few very fine roots; common very fine pores; common moderately thick clay films on faces of peds; neutral (pH 7.1); clear smooth boundary.

C—15 to 24 inches; light gray (N 7/0) and light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist and crushed; strong medium platy structure parting to strong coarse angular blocky; extremely hard, very firm, sticky and plastic; few very fine roots; many very fine pores; neutral

(pH 7.2); abrupt smooth boundary.
Cr—24 inches; weathered shale.

Soft bedrock is at a depth of 20 to 40 inches. The mollic epipedon is 7 to 10 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 3 or 4 when dry.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 3 to 6. It is clay loam, cobbly clay loam, or gravelly clay loam. Clay content ranges from 35 to 50 percent.

Sheege Series

The Sheege series consists of shallow, well drained soils on the sides of mesas. These soils formed in colluvium and residuum derived dominantly from limestone. Slopes are 1 to 50 percent. Elevation is 8,100 to 9,600 feet. Average annual precipitation is 18 to 27 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are loamy-skeletal, carbonatic Cryic Lithic Rendolls.

Typical pedon of a Sheege gravelly sandy loam in an area of Sheege-Swapps complex, 30 to 50 percent slopes, in Coyote Hollow, in the east one-half of sec. 6, T. 39 S., R. 4 W.

A1—0 to 2 inches; brown (10YR 4/3) gravelly sandy loam, dark brown (10YR 3/3) moist and crushed; weak very fine granular structure; loose, friable, slightly sticky and slightly plastic; common very fine and fine roots; 15 percent pebbles and 5 percent cobbles; slightly calcareous; mildly alkaline (pH 7.4); clear smooth boundary.

A2—2 to 8 inches; grayish brown (10YR 5/2) very cobbly loam, dark brown (10YR 3/3) moist; weak very fine granular structure; loose, friable; common very fine and fine roots and few medium and coarse roots; 35 percent cobbles; strongly calcareous; mildly alkaline (pH 7.4); clear wavy boundary.

A3—8 to 16 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to weak very fine granular; loose, friable; many very fine and fine roots and common medium and coarse roots; 20 percent pebbles, 15 percent cobbles, and 5 percent stones; very strongly calcareous; mildly alkaline (pH 7.5); abrupt wavy boundary.

Bk—16 to 19 inches; white (10YR 8/2) very cobbly silt loam, pale brown (10YR 6/3) moist; moderate medium and fine angular blocky structure; very hard, firm, slightly sticky and plastic; many very fine and few fine pores; 20 percent cobbles, 20 percent pebbles, and 10 percent stones; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

R—19 inches; fractured limestone.

Bedrock is at a depth of 16 to 20 inches. The mollic epipedon is 12 to 16 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 1 to 3.

The Bk horizon has value of 3 to 6 when dry and 5 to 7 when moist, and it has chroma of 2 to 4. It is very gravelly loam or very cobbly silt loam.

Showalter Series

The Showalter series consists of very deep, well drained soils on pediments. These soils formed in mixed alluvium derived from intermediate volcanic rock. Slopes are 0 to 30 percent. Elevation is 7,400 to 8,400 feet. Average annual precipitation is 14 to 18 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are clayey-skeletal, montmorillonitic Typic Argiborolls.

Typical pedon of a Showalter gravelly loam in an area of Showalter-Guben complex, dry, 0 to 8 percent slopes, on Tom Best Spring Road, in the SW¼ of sec. 22, T. 35 S., R. 4 W.

A—0 to 5 inches; dark brown (10YR 4/3) gravelly loam, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, friable, slightly sticky and slightly plastic; many medium, fine, and very fine roots; common fine and very fine pores; 15 percent subrounded pebbles; neutral (pH 7.5); abrupt smooth boundary.

Bt1—5 to 10 inches; dark brown (10YR 4/3) gravelly loam, very dark brown (10YR 2/2); weak medium prismatic structure parting to weak fine subangular blocky; hard, friable, slightly sticky and slightly plastic; many medium, fine, and very fine roots; common fine and very fine pores; common thin clay films on faces of peds and in pores; 15 percent subrounded pebbles and 15 percent subrounded cobbles; neutral (pH 7.0); abrupt smooth boundary.

Bt2—10 to 17 inches; brown (7.5YR 4/4) very gravelly clay loam, dark reddish brown (5YR 3/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine pores; common moderately thick clay films on faces of peds and in pores; organic staining on faces of peds; 40 percent subangular to subrounded pebbles; neutral (pH 7.0); gradual wavy boundary.

2Bt3—17 to 22 inches; yellowish red (5YR 5/6) very gravelly clay, reddish brown (5YR 4/4) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; few fine roots; few fine pores; 30 percent subangular and subrounded pebbles and 15 percent subangular and subrounded cobbles; some cobbles are weathered; common moderately thick clay films; neutral (pH 7.0); gradual wavy boundary.

2Btk1—22 to 30 inches; yellowish red (5YR 5/6) and pinkish white (5YR 8/2) very gravelly clay loam, reddish brown (5YR 5/4) and pinkish gray (5YR 7/2) moist; moderate medium and fine subangular blocky structure; very hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; few fine and very fine pores; common moderately thick clay films on faces of peds and in pores; 35 percent subangular and subrounded pebbles and 10 percent subangular and subrounded cobbles; coatings of carbonate on underside of cobbles; mildly alkaline (pH 7.5); clear wavy boundary.

2Btk2—30 to 36 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy clay loam, dark brown (7.5YR 4/4) moist and crushed; pale yellow (5Y 8/3) mottles; moderate medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine roots; few fine and very fine pores; few thin clay films on some faces of peds and in pores; 50 percent subangular and subrounded pebbles and 20 percent subangular and subrounded cobbles; coatings of lime on underside of cobbles; very strongly calcareous in spots; mildly alkaline (pH 7.5); clear wavy boundary.

3Bk—36 to 48 inches; pinkish white (7.5YR 8/2) and brown (7.5YR 5/4) gravelly loam, pink (7.5YR 7/4) and brown (7.5YR 4/4) moist; moderate medium platy structure; slightly hard, slightly sticky and slightly plastic; very few very fine roots; common fine tubular pores; 20 percent pebbles coated with carbonates; 70 percent of horizon has segregated carbonates that are pinkish white when dry; very strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

3C—48 to 60 inches; brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; very few very fine roots; few fine tubular pores; common carbonate fragments that are pinkish white (7.5YR 8/2) when dry and pink (7.5YR 7/4) when moist; carbonate coatings on underside of some rock fragments; 25 percent pebbles and 5 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0).

The mollic epipedon is 10 to 15 inches thick. The particle size control section averages 35 to 45 percent clay and 35 to 50 percent rock fragments. Depth to bedrock is estimated to be 5 to 30 feet.

The A and Bt1 horizons have hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3.

The Bt2, 2Bt3, and 2Btk horizons have hue of 5YR to 10YR, value of 4 or 5 when dry and 3 to 5 when moist, and chroma of 2 to 6. The Bt2 and 2Bt horizons are extremely gravelly sandy clay loam, very gravelly clay, gravelly clay loam, very gravelly clay loam, or very gravelly sandy clay loam.

The 3Bk horizon is gravelly loam or very gravelly loam.

Shupert Series

The Shupert series consists of very deep, somewhat poorly drained soils on valley flood plains and low lying alluvial fans. These soils formed in alluvium derived from mixed alluvium. Slopes are 0 to 1 percent. Elevation is 6,500 to 7,300 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed (calcareous), frigid Typic Ustifluvents.

Typical pedon of Shupert silty clay loam, wet, 0 to 1 percent slopes, about 3.5 miles north of Panguitch, in the NE¼ of sec. 9, T. 34 S., R. 5 W.

A—0 to 10 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; hard, firm, sticky and plastic; many fine and few medium roots; common fine and medium tubular pores; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); clear smooth boundary.

C1—10 to 34 inches; light gray (10YR 7/2) silty clay loam, brown (10YR 5/3) moist; massive; hard, firm, sticky and plastic; common fine roots; common fine tubular pores; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); clear smooth boundary.

C2—34 to 42 inches; very pale brown (10YR 7/3) clay loam, dark yellowish brown (10YR 4/6) moist; few medium distinct reddish brown (5YR 4/4) mottles with gray (5YR 6/1) gleying; massive; very hard, firm, sticky and plastic; common fine roots; common fine pores; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); gradual wavy boundary.

C3—42 to 60 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; few medium distinct reddish brown (5YR 4/4) mottles with gray (5YR 6/1) gleying; massive; hard, friable, sticky and plastic; few fine roots; strongly calcareous; carbonates are disseminated; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more. Depth to seasonal high water table is 25 to 40 inches.

The A horizon has value of 5 or 6 when dry and 4 or 5 when moist, and it has chroma of 2 or 3. It is silty clay loam or very fine sandy loam. It is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

The C horizon has value of 6 or 7 when dry and 4 or 5 when moist, and it has chroma of 2 or 3. It is stratified fine sandy loam to silty clay loam. Clay content is 18 to 35 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Sielo Series

The Sielo series consists of very deep, well drained soils on mesas and benches. These soils formed in residuum derived dominantly from limestone and shale. Slopes are 2 to 12 percent. Elevation is 8,400 to 9,000 feet. Average annual precipitation is 20 to 25 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are fine, kaolinitic Glossic Cryoboralfs.

Typical pedon of Sielo very fine sandy loam, 2 to 12 percent slopes, in Dry Fork, in the SE¼ of sec. 12, T. 39 S., R. 5 W.

O1 and O2—2 inches to 0; partly decomposed to highly decomposed litter.

E—0 to 5 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (7.5YR 5/4) moist; weak medium platy structure parting to weak fine granular; slightly hard, firm, nonsticky and nonplastic; common fine and medium roots; common fine interstitial and vesicular pores; medium acid (pH 6.0); clear smooth boundary.

E/B—5 to 9 inches; about 80 percent A2 material that is very pale brown (10YR 7/3) very fine sandy loam, brown (7.5YR 4/4) moist; weak medium platy structure parting to weak fine granular; slightly hard, friable, nonsticky; few fine interstitial and vesicular pores; medium acid (pH 6.0); about 20 percent B2t material that is the same as the B21t horizon below; abrupt irregular boundary.

Bt1—9 to 18 inches; red (2.5YR 5/6) clay, red (2.5YR 4/6) moist; strong medium prismatic structure parting to strong medium angular blocky; very hard, firm, sticky and plastic; few fine and coarse roots; few fine interstitial and tubular pores; continuous moderately thick clay films on faces of peds; organic staining on faces of peds; 10 percent rock fragments; few small calcareous spots; slightly acid (pH 6.5); gradual wavy boundary.

Bt2—18 to 23 inches; red (2.5YR 5/6) clay, red (2.5YR 4/6) moist; strong medium prismatic structure parting to strong medium angular blocky; very hard, very firm, sticky and plastic; few fine and coarse roots; few fine interstitial and tubular pores; many moderately thick clay films on faces of peds; 10 percent rock fragments; few small calcareous spots; slightly acid (pH 6.5); gradual wavy boundary.

Bt3—23 to 36 inches; red (2.5YR 5/6) silty clay, red (2.5YR 4/6) moist; strong coarse prismatic structure parting to strong medium angular blocky; extremely hard, extremely firm, sticky and plastic; few thin clay films in pores; slightly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

Bt4—36 to 46 inches; pink (5YR 7/4) silty clay loam, light red (2.5YR 6/6) moist; moderate fine and medium subangular blocky structure; very hard, firm, sticky and plastic; few fine roots; common moderately thick clay films on faces of peds; slightly calcareous; moderately alkaline (pH 8.0); gradual irregular boundary.

BC—46 to 60 inches; light red (2.5YR 6/6) silty clay, dark red (2.5YR 3/6) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; few fine roots; few thin clay films on pores; slightly calcareous; moderately alkaline (pH 8.0).

Depth to soft bedrock ranges from 60 to 70 inches. The particle size control section averages 10 to 35 percent rock fragments.

The E horizon has hue of 5YR to 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 4 to 6.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 6 to 8. It is clay, silty clay loam, or silty clay. Clay content is 35 to 45 percent.

Skutum Series

The Skutum series consists of deep, moderately well drained soils on valley floors, bottom lands, benches, and toe slopes. These soils formed in mixed alluvium derived dominantly from sedimentary rock. Slopes are 1 to 35 percent. Elevation is 8,000 to 8,800 feet. Average annual precipitation is 18 to 25 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are fine, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of Skutum fine sandy loam, 10 to 35 percent slopes, near the junction of Robinson Canyon and East Fork Sevier River, in the SE¼ of sec. 10, T. 39 S., R. 4.5 W.

O1—1 inch to 0; aspen litter, duff, and twigs.

A1—0 to 6 inches; dark brown (7.5YR 4/2) fine sandy loam, dark brown (7.5YR 3/2) moist; weak very fine granular structure; soft, friable, nonsticky and nonplastic; common fine and very fine roots; common very fine pores; 10 percent pebbles; neutral (pH 7.0); clear smooth boundary.

A2—6 to 12 inches; brown (7.5YR 5/2) fine sandy loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak very fine granular; common very fine, fine, and medium roots; common very fine interstitial pores; soft, friable, nonsticky and nonplastic; 10 percent pebbles; neutral (pH 7.0); clear smooth boundary.

A3—12 to 17 inches; brown (7.5YR 5/2) fine sandy loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky and nonplastic; common medium and coarse roots and few very fine roots; 10 percent pebbles; slightly acid (pH 6.5); clear smooth boundary.

Bt1—17 to 24 inches; brown (7.5YR 5/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, firm, sticky and plastic; common medium and coarse roots and few very fine roots; common very fine tubular pores; common moderately thick clay films on faces of peds; 20 percent pebbles; slightly acid (pH 6.5); gradual wavy boundary.

Bt2—24 to 36 inches; brown (7.5YR 5/4) and very dark gray (N 3/0) gravelly clay, brown (7.5YR 4/4) and black (N 2/0) moist; moderate fine and medium subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; common moderately thick clay films on faces of peds; 15 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

2C—36 to 50 inches; brownish yellow (10YR 6/6) gravelly sandy loam, yellowish brown (10YR 5/6) moist; massive; slightly hard, firm, slightly sticky and nonplastic; 25 percent pebbles and 5 percent cobbles; slightly acid (pH 6.5); gradual smooth boundary.

Cr—50 inches; fractured gray shale.

The mollic epipedon is 16 to 30 inches thick. Depth to shale ranges from 50 to 60 inches. The particle size control section averages 35 to 42 percent clay and 15 to 35 percent rock fragments.

The A horizon has hue of 5YR to 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 to 4 when dry and 2 or 3 when moist. It is fine sandy loam or very fine sandy loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 7 when dry and 3 to 6 when moist, and chroma of 3 to 6. It is gravelly clay loam or gravelly clay.

The C horizon has hue of 2.5YR to 10YR, value of 3 to 6 when moist, and chroma of 3 to 6.

Swapps Series

The Swapps series consists of moderately deep, well drained soils on benches, hillsides, and mountainsides. These soils formed in colluvium and residuum derived dominantly from limestone and shale. Slopes are 5 to 65 percent. Elevation is 8,200 to 9,600 feet. Average annual precipitation is 18 to 27 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are fine-loamy, mixed Mollic Cryoboralfs.

Typical pedon of a Swapps gravelly loam in an area of Pahreah-Swapps complex, 25 to 65 percent slopes, in Robinson Canyon, northwest of Horse Hollow; in the NW¼ of sec. 12, T. 39 S., R. 5 W.

O1—1 inch to 0; undecomposed to partly decomposed conifer needles and twigs.

A—0 to 3 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist and crushed; weak thin platy structure and weak medium granular; loose, friable, nonsticky and nonplastic; many very fine roots; common very fine pores; 15 percent pebbles; slightly acid (pH 6.5); abrupt smooth boundary.

Bt—3 to 8 inches; yellowish red (5YR 5/6) gravelly loam, reddish brown (5YR 4/4) moist and crushed; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; common thin clay film on faces of peds and many thin clay films in pores and root channels; 20 percent fine pebbles; slightly calcareous; mildly alkaline (pH 7.5); abrupt wavy boundary.

C1—8 to 15 inches; dark brown (7.5YR 4/2) very gravelly loam, dark brown (7.5YR 3/2) moist and crushed; massive; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium and coarse roots; few fine pores; 35 percent fine pebbles; strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

C2—15 to 23 inches; pink (7.5YR 7/4) very gravelly loam, reddish yellow (7.5YR 6/6) moist and crushed; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and many coarse roots; few fine pores; 60 percent pebbles; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary.

R—23 inches; limestone.

Bedrock is at a depth of 20 to 40 inches.

The A horizon has hue of 5YR to 10YR, value of 4 or 5 when dry and 2 to 4 when moist, and chroma of 2 to 6.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6 when dry and 2 to 4 when moist, and chroma of 3 to 6. It is gravelly loam or cobbly clay loam. Rock fragment content is 20 to 35 percent.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 8 when dry and 3 to 7 when moist, and chroma of 2 to 8. It is gravelly loam, very gravelly loam, cobbly loam, or very cobbly loam.

Syrett Series

The Syrett series consists of moderately deep, well drained soils on benches and side slopes of mesas. These soils formed in colluvium and residuum derived dominantly from limestone. Slopes are 2 to 40 percent. Elevation is 7,100 to 8,500 feet. Average annual precipitation is 16 to 22 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are loamy-skeletal, mixed Entic Haploborolls.

Typical pedon of Syrett gravelly loam, 2 to 12 percent slopes, near East Creek, in the NE¼SW¼ of sec. 34, T. 36 S., R. 4 W.

A1—0 to 1 inch; brown (7.5YR 5/4) gravelly loam, dark brown (10YR 3/3) moist and crushed; weak very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; common fine pores; 20 percent pebbles; slightly calcareous; mildly alkaline (pH 7.5); clear smooth boundary.

A2—1 to 4 inches; brown (7.5YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine pores; 40 percent pebbles; slightly calcareous; mildly alkaline (pH 7.5); gradual wavy boundary.

A3—4 to 12 inches; brown (7.5YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; common very fine, medium, and coarse roots; few fine pores; 40 percent pebbles; very strongly calcareous; mildly alkaline (pH 7.5); gradual wavy boundary.

C1—12 to 23 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; 55 percent pebbles; very strongly calcareous; mildly alkaline (pH 7.5); abrupt wavy boundary.

C2—23 to 38 inches; reddish yellow (7.5YR 7/8) very gravelly silt loam, reddish yellow (7.5YR 6/8) moist; massive; hard, firm, slightly sticky and slightly plastic; 40 percent pebbles; very strongly calcareous; mildly alkaline (pH 7.5); gradual wavy boundary.

R—38 inches; limestone.

Bedrock is at a depth of 20 to 40 inches. The mollic epipedon is 7 to 16 inches thick. The particle size control section averages 35 to 60 percent rock fragments.

The A horizon has hue of 5YR to 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 3 or 4 when dry and 2 or 3 when moist.

The C horizon and the Bk horizon, if it occurs, have hue of 5YR to 10YR, value of 4 to 8 when dry and 3 to 6 when moist, and chroma of 2 to 8. They are very gravelly loam or very gravelly silt loam.

Tebbs Series

The Tebbs series consists of very deep, well drained soils on dissected alluvial fans and valley plains. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 1 to 5 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are coarse-loamy, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Tebbs sandy loam, 2 to 5 percent slopes, in the NW¼ of sec. 14, T. 34 S., R. 5 W.

Ap—0 to 5 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; moderate thin platy structure parting to weak fine granular; soft, very friable; many fine roots; common very fine pores; strongly calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

C1—5 to 28 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common fine and medium pores; strongly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

C2—28 to 35 inches; light gray (10YR 7/2) loamy sand, grayish brown (10YR 5/2) moist; single grain; loose; few fine roots; few fine interstitial pores; strongly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

C3—35 to 60 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable; few fine roots; few very fine pores; strongly calcareous; moderately alkaline (pH 8.4).

Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 2 or 3. It is sandy loam or loam. It is slightly calcareous to strongly calcareous. Reaction is mildly alkaline to strongly alkaline.

The C horizon has value of 6 or 7 when dry and 4 to 6 when moist, and it has chroma of 2 to 4. It is stratified loamy sand to loam. Clay content is 3 to 18 percent. Rock fragment content is 0 to 10 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is mildly alkaline to strongly alkaline.

Tica Family

The Tica Family consists of shallow, well drained soils on hillsides and mountainsides. These soils formed in residuum derived from intermediate volcanic rock. Slopes are 20 to 70 percent. Elevation is 8,300 to 9,400 feet. Average annual precipitation is 16 to 22 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are clayey-skeletal, montmorillonitic Argic Lithic Cryoborolls.

Typical pedon of a Tica Family cobbly loam in an area of Castino-Tica Family complex, 20 to 70 percent slopes, near Cottonwood Creek; in the SW¼ of sec. 9, T. 33 S., R. 3 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak coarse platy structure parting to weak very fine granular; soft, very friable, nonsticky; common fine and very fine roots; few very fine interstitial pores; 15 percent cobbles, 10 percent pebbles, and 5 percent stones; slightly acid (pH 6.5); abrupt smooth boundary.

A2—2 to 5 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; weak medium and very fine granular structure; soft, friable, slightly sticky and nonplastic; common very fine, fine, and medium roots; common fine interstitial pores; 15 percent cobbles, 10 percent pebbles, and 5 percent stones; slightly acid (pH 6.5); gradual wavy boundary.

Bw1—5 to 9 inches; dark grayish brown (10YR 4/2) very cobbly clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; common very fine and medium roots; common fine interstitial pores; 20 percent cobbles, 10 percent stones, and 5 percent pebbles; neutral (pH 7.0); clear wavy boundary.

Bt1—9 to 15 inches; grayish brown (10YR 5/2) and dark grayish brown (2.5Y 4/2) very stony clay, dark grayish brown (10YR 4/2) and very dark grayish brown (2.5Y 3/1) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few coarse and very fine roots; few fine and coarse interstitial roots; many thin clay films on faces of peds; 25 percent stones, 15 percent cobbles, and 5 percent pebbles; neutral (pH 7.0); gradual wavy boundary.

Bt2—15 to 18 inches; grayish brown (10YR 5/2) and dark grayish brown (2.5Y 4/2) very stony clay loam, dark grayish brown (10YR 4/2) and very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and coarse roots; few fine and coarse interstitial pores; common thin clay films on faces of peds; few iron stains; 30 percent stones, 15 percent cobbles, and 5 percent pebbles; mildly alkaline (pH 7.5); abrupt irregular boundary.

R—18 inches; intermediate volcanic agglomerate.

Bedrock is at a depth of 15 to 20 inches. The mollic epipedon is 8 to 15 inches thick.

The A and Bw horizons have value of 4 or 5 when dry and 2 or 3 when moist. They are cobbly loam or very cobbly clay loam.

The Bt horizon has hue of 2.5Y or 10YR, and it has value of 4 or 5 when dry and 3 or 4 when moist. It is very stony clay loam or very stony clay.

Tolman Series

The Tolman series consists of shallow, well drained soils on mountainsides and ridges. These soils formed in residuum derived dominantly from basic and intermediate igneous rock. Slopes are 8 to 40 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are loamy-skeletal, mixed Lithic Argiborolls.

Typical pedon of Tolman very cobbly silt loam, 8 to 35 percent slopes, about 12 miles north of Bear Valley Junction, in the SE¼ of sec. 9, T. 31 S., R. 5 W.

A1—0 to 12 inches; brown (10YR 4/3) very cobbly silt loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, sticky and plastic; many fine and common medium roots; common fine tubular pores; 40 percent cobbles, 10 percent pebbles, and 10 percent stones; mildly alkaline (pH 7.4); clear wavy boundary.

Bt—12 to 16 inches; brown (10YR 4/3) very cobbly clay loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; few fine and medium tubular pores; continuous thin clay films; 40 percent cobbles and 15 percent pebbles; moderately alkaline (pH 7.9); gradual wavy boundary.

R—16 inches; igneous bedrock.

Bedrock is at a depth of 10 to 20 inches. The mollic epipedon is 10 to 16 inches thick.

The A horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3. It is very cobbly silt loam or very cobbly loam. Rock fragment content is 50 to 60 percent.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry, and chroma of 2 or 3. It is very cobbly clay loam or extremely cobbly sandy clay loam. Clay content is 20 to 35 percent. Rock fragment content is 55 to 65 percent.

Tridell Series

The Tridell series consists of very deep, well drained soils on dissected alluvial fans and mountainsides. These soils formed in alluvium derived from mixed sedimentary and igneous rock. Slopes are 2 to 50 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are loamy-skeletal, mixed Aridic Calciborolls.

Typical pedon of Tridell cobbly loam, 4 to 25 percent slopes, about 2.5 miles northeast of Bear Valley Junction, about 2,400 feet south and 2,400 feet east of the northwest corner of sec. 26, T. 32 S., R. 5 W.

A1—0 to 2 inches; brown (10YR 5/3) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; slightly hard, friable; few fine roots; common fine tubular pores; 10 percent pebbles, 15 percent cobbles, and 5 percent stones; slightly calcareous; moderately alkaline (pH 8.2); abrupt smooth boundary.

A2—2 to 8 inches; brown (7.5YR 5/3) cobbly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; few fine and medium tubular pores; 5 percent pebbles and 20 percent cobbles; strongly calcareous; moderately alkaline (pH 8.4); clear wavy boundary.

Bk—8 to 27 inches; very pale brown (10YR 7/3) extremely cobbly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine tubular pores; 20 percent pebbles and 50 percent cobbles; very strongly calcareous; strongly alkaline (pH 9.0); clear smooth boundary.

2C—27 to 41 inches; light brownish gray (10YR 6/2) extremely cobbly sand, very dark gray (10YR 3/1) moist; single grain; loose; few fine roots; 40 percent pebbles and 30 percent cobbles; strongly calcareous; very strongly alkaline (pH 9.2); clear smooth boundary.

3C—41 to 48 inches; brown (10YR 5/3) gravelly loam, brown (7.5YR 5/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; 15 percent pebbles; strongly calcareous; strongly alkaline (pH 8.8); clear wavy boundary.

4C—48 to 60 inches; pinkish white (7.5YR 8/2) cobbly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable; common very fine tubular pores; 10 percent pebbles and 15 percent cobbles; very strongly calcareous; very strongly alkaline (pH 9.2).

Bedrock is at a depth of more than 60 inches. The mollic epipedon is 7 to 10 inches thick. A layer of lime accumulation is at a depth of 7 to 17 inches. The particle size control section is 35 to 70 percent rock fragments.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3. It is loam, gravelly loam, cobbly loam, or very cobbly loam. Rock fragment content is 10 to 50 percent.

The Bk and C horizons have hue of 10YR or 7.5YR, value of 5 to 8 when dry and 3 to 6 when moist, and chroma of 2 to 4. They are extremely cobbly loam, very cobbly loam, cobbly loam, gravelly loam, very gravelly sandy loam, extremely gravelly sand, extremely gravelly sandy loam, or very stony loam. They are strongly calcareous to very strongly calcareous. Reaction is moderately alkaline to very strongly alkaline.

Ustic Torrifluvents

Ustic Torrifluvents consists of very deep, well drained soils on low lying alluvial fans. These soils formed in alluvium derived dominantly from limestone and sandstone. Slopes are 2 to 8 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

Reference pedon of Ustic Torrifluvents, about 0.75 mile north of Widtsoe Junction, in Johns Valley; about 400 feet west and 600 feet north of the southeast corner of sec. 16, T. 34 S., R. 2 W.

A—0 to 11 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable; few fine, medium, and coarse roots; common fine pores; very strongly calcareous; moderately alkaline (pH 8.4); abrupt smooth boundary.

C1—11 to 21 inches; light brown (7.5YR 6/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable; few fine and medium roots; common medium pores; 35 percent pebbles and 5 percent stones; very strongly calcareous; strongly alkaline (pH 8.5); clear wavy boundary.

C2—21 to 43 inches; pink (7.5YR 7/4) extremely gravelly sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable; few fine roots; few fine interstitial pores; 80 percent pebbles and 5 percent cobbles; very strongly calcareous; strongly alkaline (pH 9.0); clear wavy boundary.

C3—43 to 60 inches; pink (7.5YR 7/4) extremely gravelly sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable; few fine roots; few fine interstitial pores; 60 percent pebbles and 5 percent cobbles; very strongly calcareous; strongly alkaline (pH 8.8).

Bedrock is at a depth of 60 inches or more. The particle size control section is sand, loamy sand, sandy loam, or coarse sandy loam.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4. It is strongly calcareous or very strongly calcareous.

The C horizon has hue of 5YR to 2.5Y, and it has value of 5 to 8 when dry and 3 to 7 when moist. It is 20 to 75 percent rock fragments, including stones, cobbles and pebbles. Clay content ranges from 2 to 18 percent. The horizon is moderately alkaline or strongly alkaline.

Vanet Series

The Vanet series consists of shallow, well drained soils on colluvial side slopes of mesas. These soils formed in colluvium and residuum derived dominantly from shale and limestone. Slopes are 20 to 40 percent. Elevation is 8,000 to 8,500 feet. Average annual precipitation is 16 to 22 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are loamy-skeletal, mixed, frigid, shallow Typic Ustochrepts.

Typical pedon of a Vanet gravelly loam in an area of Syrett-Vanet gravelly loams, 20 to 40 percent slopes, on Eastside Road, in the SE¼SE¼ of sec. 36, T. 37 S. R. 4.5 W.

A1—0 to 2 inches; brown (7.5YR 4/4) gravelly loam, dark brown (7.5YR 3/3) moist and crushed; weak thin platy structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine pores; 5 percent angular pebbles; neutral (pH 7.4); abrupt smooth boundary.

Bw1—2 to 7 inches; yellowish red (5YR 4/6) gravelly clay loam, yellowish red (5YR 3/6) moist and crushed; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; common very fine and fine roots and few medium roots; common very fine and fine pores; 20 percent pebbles; strongly calcareous; mildly alkaline (pH 7.5); abrupt wavy boundary.

Bw2—7 to 11 inches; reddish brown (5YR 4/4) very gravelly loam, dark reddish brown (5YR 3/4) moist and crushed; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; 45 percent pebbles; strongly calcareous; mildly alkaline (pH 7.5); abrupt wavy boundary.

Bk—11 to 14 inches; brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/2) moist and crushed; massive; soft, friable, slightly sticky and slightly plastic; many very fine roots and common fine, medium, and coarse roots (root mat); 35 percent pebbles; very strongly calcareous; mildly alkaline (pH 7.6); abrupt wavy boundary.

Cr—14 inches; soft limestone.

Paralithic contact is at a depth of 10 to 20 inches. Hard bedrock is at a depth of 20 to 40 inches. The particle size control section averages 35 to 50 percent rock fragments.

The A horizon has hue of 5YR or 7.5YR, and it has chroma of 3 or 4 when moist.

The Bw horizon has value of 4 or 5 when dry, and it has chroma of 4 to 6. It is gravelly loam, gravelly clay loam, very gravelly clay loam, or cobbly clay loam.

The Bk horizon has hue of 2.5YR to 7.5YR, value of 4 to 7 when dry and 4 to 6 when moist, and chroma of 2 to 8.

Venture Series

The Venture series consists of shallow, well drained soils on mountainsides and ridges. These soils formed in residuum, colluvium, and alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 4 to 30 percent. Elevation is 6,500 to 7,500 feet. Average annual precipitation is 9 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are loamy-skeletal, mixed, shallow Aridic Argiborolls.

Typical pedon of Venture very cobbly silt loam, 4 to 25 percent slopes, about 8 miles north of Bear Valley Junction, about 1,800 feet south and 900 feet west of the northeast corner of sec. 34, T. 31 S., R. 5 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) very cobbly silt loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and medium roots; few fine and medium tubular pores; 30 percent cobbles, 25 percent pebbles, and 5 percent stones; neutral (pH 7.2); clear smooth boundary.

Bt—6 to 10 inches; brown (10YR 4/3) very gravelly clay loam, dark brown (10YR 3/3) moist; weak medium angular blocky structure; very hard, firm, sticky and plastic; few fine and medium roots; few fine tubular pores; few thin clay films; 30 percent pebbles and 5 percent cobbles; neutral (pH 7.0); clear smooth boundary.

Btk—10 to 15 inches; pale brown (10YR 6/3) very gravelly clay loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; hard, firm, slightly sticky and plastic; common fine and medium roots and few coarse roots; few fine tubular pores; few thin clay films; 30 percent pebbles and 5 percent cobbles; moderately calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

Bkm—15 inches; indurated lime-cemented hardpan.

A lime-cemented hardpan is at a depth of 10 to 20 inches. The mollic epipedon is 9 to 13 inches thick. The particle size control section is 35 to 45 percent rock fragments. Secondary carbonates are at a depth of 9 to 13 inches.

The A horizon has hue of 10YR or 7.5YR, and it has value of 4 or 5 when dry and 2 or 3 when moist. It is loam, cobbly loam, or very cobbly silt loam. Reaction is neutral or mildly alkaline.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 to 4. It is very cobbly clay loam or very gravelly clay loam. Clay content is 28 to 35 percent. Rock fragment content is 35 to 45 percent. Reaction is neutral to moderately alkaline.

The Bk horizon, if it occurs, has chroma of 2 or 3. Rock fragment content is 35 to 45 percent.

Villy Family

The Villy Family consists of very deep, poorly drained soils on valley flood plains. These soils formed in alluvium derived dominantly from mixed igneous rock. Slopes are 0 to 2 percent. Elevation is 6,500 to 7,200 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-silty, mixed (calcareous), frigid Typic Fluvaquents.

Reference pedon of a Villy Family silty clay loam, 0 to 2 percent slopes, ⅓ mile northeast of the Dog Valley turnoff, in the NE¼ of sec. 26, T. 32 S., R. 5 W.

O2—2 inches to 0; organic litter containing some silty clay loam material.

A—0 to 11 inches; light brownish gray (10YR 6/2) silty clay loam, dark gray (10YR 4/1) moist; weak medium granular structure; hard, friable, slightly sticky and plastic; many fine and medium roots; few very fine and fine tubular pores; strongly calcareous; strongly alkaline (pH 8.8); clear smooth boundary.

C—11 to 16 inches; light gray (10YR 7/1) silty clay loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; hard, friable, slightly sticky and plastic; common fine and few medium roots; common very fine tubular pores; strongly calcareous; moderately alkaline (pH 8.4); abrupt smooth boundary.

Cg1—16 to 32 inches; white (N 8/0) silty clay loam, light gray (10YR 6/1) moist; massive; very hard, firm, sticky and plastic; common fine and medium roots; few fine tubular pores; strongly calcareous; strongly alkaline (pH 8.6); clear wavy boundary.

Cg2—32 to 54 inches; light gray (N 7/0) silty clay loam, dark gray (5YR 4/1) moist; common medium distinct grayish green (5G 5/2) mottles; massive; extremely hard, firm, sticky and plastic; few fine roots; few fine tubular pores; moderately calcareous; strongly alkaline (pH 8.6); clear wavy boundary.

Cg3—54 to 60 inches; gray (10YR 5/1) silty clay loam, very dark gray (5Y 3/1) moist; many medium distinct grayish green (5G 4/2) mottles; massive; extremely hard, firm, very sticky and plastic; few fine roots; common very fine and few fine tubular pores; moderately calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more. Depth to a seasonal high water table is 0 to 24 inches. Conductivity of the saturation extract is 4 to 8 millimhos in the particle size control section.

The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 1 or 2.

The C horizon is neutral or has hue of 10YR to 5Y. It has value of 5 to 8 when dry and 3 to 6 when moist, and it has chroma of 0 or 1. Clay content is 28 to 35 percent. The horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Waltershow Series

The Waltershow series consists of very deep, well drained soils on mountainsides. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 8 to 60 percent. Elevation is 6,800 to 7,500 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are clayey-skeletal, montmorillonitic Aridic Argiborolls.

Typical pedon of Waltershow extremely cobbly loam, 8 to 40 percent slopes, about 3 miles north of Bear Valley Junction, in the SW¼ of sec. 22, T. 32 S., R. 5 W.

A—0 to 3 inches; brown (7.5YR 4/2) extremely cobbly loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common very fine pores; 30 percent pebbles, 25 percent cobbles, and 10 percent stones; mildly alkaline (pH 7.4); clear smooth boundary.

Bt1—3 to 10 inches; brown (7.5YR 5/2) very cobbly clay, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; common fine, medium, and coarse roots; few fine and medium pores; common moderately thick clay films on faces of peds; 30 percent pebbles and 30 percent cobbles; mildly alkaline (pH 7.5); clear wavy boundary.

Bt2—10 to 20 inches; light brownish gray (10YR 6/2) very cobbly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; common fine, medium, and coarse roots; common very fine pores; common thin clay films on faces of peds; 25 percent pebbles, 30 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.4); gradual wavy boundary.

Bk1—20 to 31 inches; light gray (10YR 7/2) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, very friable; few fine, medium, and coarse roots; common fine interstitial pores; 50 percent pebbles, 15 percent cobbles, and 5 percent stones; strongly calcareous; carbonates are in veins; strongly alkaline (pH 8.6); gradual wavy boundary.

Bk2—31 to 39 inches; white (10YR 8/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; moderately cemented; few fine roots; few fine pores; 50 percent pebbles, 15 percent cobbles, and 5 percent stones; strongly calcareous; carbonates are in soft masses; strongly alkaline (pH 8.6); gradual wavy boundary.

C—39 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly sand, dark grayish brown (10YR 4/2) moist; single grain; loose; common fine interstitial pores; 60 percent pebbles, 15 percent cobbles, and 5 percent stones; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.4).

Bedrock is at a depth of 60 inches or more.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 or 3. It is very cobbly clay or very cobbly clay loam. Clay content is 35 to 45 percent.

The Bk horizon has value of 7 or 8 when dry and 4 or 5 when moist.

Whiteman Series

The Whiteman series consists of shallow, somewhat excessively drained soils on mesas and ridges. These soils formed in residuum derived dominantly from limestone. Slopes are 1 to 70 percent. Elevation is 8,200 to 9,300 feet. Average annual precipitation is 20 to 25 inches, and average annual air temperature is 36 to 42 degrees F.

These soils are loamy-skeletal, mixed Lithic Mollic Cryoboralfs.

Typical pedon of Whiteman very cobbly very fine sandy loam, 1 to 6 percent slopes, 0.4 mile northeast of the intersection of Bryce Canyon Highway and the Garfield-Kane County line, in the SE¼ of sec. 31, T. 37 S., R. 4 W.

A—0 to 2 inches; brown (7.5YR 5/4) very cobbly very fine sandy loam, dark brown (7.5YR 3/2) moist; moderately thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common medium vesicular pores; 45 percent cobbles; neutral (pH 7.2); abrupt smooth boundary.

Bt—2 to 11 inches; reddish brown (5YR 5/4) very cobbly clay loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; very hard, firm, sticky and plastic; few fine, medium, and coarse roots; few fine tubular pores; 50 percent cobbles; moderate continuous clay films; neutral (pH 7.2); clear wavy boundary.

R—11 inches; fractured limestone.

Bedrock is at a depth of 10 to 18 inches. The particle size control section is 35 to 90 percent rock fragments, but it averages 50 to 70 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 4 to 6.

Widtsoe Series

The Widtsoe series consists of very deep, well drained soils on mountainsides and ridges. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 8 to 40 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are loamy-skeletal, mixed Typic Argiborolls.

Typical pedon of Widtsoe gravelly sandy loam, 8 to 40 percent slopes, about 3.5 miles southwest of Antimony, in the SW¼ of sec. 25, T. 31 S., R. 2.5 W.

A—0 to 8 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable; common fine roots; common fine interstitial pores; 25 percent pebbles, 5 percent cobbles, and 1 percent stones; neutral (pH 7.0); clear smooth boundary.

Bt—8 to 15 inches; reddish brown (5YR 4/4) very gravelly clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and medium roots and few coarse roots; few fine and medium interstitial pores; few thin clay films on faces of peds; 50 percent pebbles and 10 percent cobbles; neutral (pH 7.0); abrupt broken boundary.

Bk1—15 to 19 inches; pink (5YR 8/4) very cobbly clay loam, reddish yellow (5YR 6/6) moist; massive; very hard, very firm; few medium and coarse roots; 35 percent cobbles and 15 percent pebbles coated with carbonates; very strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

2Bk2—19 to 31 inches; brown (7.5YR 5/2) very cobbly loamy sand, dark brown (7.5YR 4/2) moist; massive; soft, very friable; common medium and coarse roots; common medium interstitial pores; 30 percent cobbles and 25 percent pebbles coated with carbonates on underside; very strongly calcareous; mildly alkaline (pH 7.8); abrupt broken boundary.

2Bk3—31 to 33 inches; pinkish white (7.5YR 8/2) extremely cobbly sandy loam, pinkish white (7.5YR 8/2) moist; massive; very hard, very firm; few very fine roots; 35 percent cobbles and 30 percent pebbles coated with carbonates; very strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary.

2Bk4—33 to 60 inches; reddish brown (5YR 5/4) and pink (5YR 8/4) extremely cobbly sandy loam, reddish brown (5YR 4/4) and yellowish red (5YR 5/6) moist; massive; very hard, very firm; 35 percent pebbles and 30 percent cobbles coated with carbonates; strongly calcareous; moderately alkaline (pH 8.0).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 7 to 10 inches thick. The solum is 14 to 18 inches thick. The particle size control section is 35 to 60 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. Rock fragment content is 25 to 35 percent.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 4 to 6. Clay content is 25 to 35 percent. Rock fragment content is 35 to 60 percent. Reaction is neutral to moderately alkaline.

The Bk horizon has hue of 5YR or 7.5YR, value of 5 to 8 when dry and 4 to 8 when moist, and chroma of 2 to 6. It is very cobbly loamy sand or extremely cobbly sandy loam. Clay content is 10 to 20 percent. Rock fragment content is 50 to 65 percent. The horizon is strongly calcareous or very strongly calcareous. Reaction is mildly alkaline or moderately alkaline.

Wiggler Series

The Wiggler series consists of shallow, well drained soils on mountainsides. These soils formed in residuum and colluvium derived dominantly from shale. Slopes are 15 to 70 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 18 inches, and average annual air temperature is 38 to 45 degrees F.

These soils are loamy, mixed (calcareous), frigid, shallow Typic Ustorthents.

Typical pedon of a Wiggler very cobbly loam in an area of Wiggler-Guben complex, 25 to 50 percent slopes, about 3.5 miles northwest of Hatch, about 900 feet north and 2,250 feet east of the southwest corner of sec. 14, T. 36 S., R. 6 W.

A—0 to 7 inches; gray (10YR 6/1) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; common fine and medium pores and few coarse pores; 20 percent pebbles, 15 percent cobbles, and 5 percent stones; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); gradual wavy boundary.

C1—7 to 12 inches; light gray (10YR 7/1) loam, grayish brown (10YR 5/2) moist; moderate medium granular structure; slightly hard, friable, sticky and plastic; common fine and medium roots and few coarse roots; few fine, medium, and coarse pores; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); gradual wavy boundary.

C2—12 to 19 inches; light gray (10YR 7/1) clay loam, grayish brown (10YR 5/2) moist; weak fine angular blocky structure; slightly hard, firm, sticky and plastic; few fine, medium, and coarse roots; few fine and medium pores; 10 percent hard shale fragments; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); gradual wavy boundary.

Cr—19 inches; shale.

Paralithic contact is at a depth of 8 to 20 inches. The particle size control section is 0 to 30 percent rock fragments.

The A horizon has value of 6 or 7 when dry and 3 to 6 when moist, and it has chroma of 1 to 6. It is very cobbly loam, channery loam, or channery clay loam. Reaction is moderately alkaline or strongly alkaline.

The C horizon has value of 7 when dry and 5 or 6 when moist, and it has chroma of 1 or 2. It is loam or clay loam. Clay content is 18 to 32 percent. Reaction is moderately alkaline or strongly alkaline.

Winetti Series

The Winetti series consists of very deep, somewhat excessively drained soils on narrow valley bottoms and toe slopes. These soils formed in mixed alluvium derived dominantly from sandstone, limestone, and shale. Slopes are 2 to 7 percent. Elevation is 7,200 to 8,000 feet. Average annual precipitation is 14 to 18 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are loamy-skeletal, mixed (calcareous), frigid Typic Ustifluvents.

Typical pedon of Winetti gravelly sandy loam, 2 to 7 percent slopes, in Ponderosa Canyon, in the NW¼ of sec. 16, T. 38 S., R. 4 W.

A—0 to 4 inches; brown (7.5YR 5/2) gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; common fine interstitial pores; 25 percent pebbles; mildly alkaline (pH 7.5); clear smooth boundary.

C1—4 to 7 inches; light yellowish brown (10YR 6/4) gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; loose; common fine roots; common fine interstitial pores; 20 percent pebbles; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

C2—7 to 17 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common medium interstitial pores; 30 percent pebbles; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

C3—17 to 24 inches; brown (7.5YR 5/4) and light yellowish brown (10YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; weak thick platy structure; soft, friable, slightly sticky and nonplastic; common very fine and coarse roots; few fine interstitial and tubular pores; 5 percent pebbles; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

C4—24 to 60 inches; yellowish red (5YR 5/6) very gravelly sandy loam, yellowish red (5YR 4/6) moist; massive; loose; few very fine roots; common coarse interstitial pores; 50 percent pebbles and 5 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0).

The particle size control section averages 35 to 50 percent rock fragments. Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 5YR to 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 to 4.

The C horizon has hue of 5YR to 10YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 to 6. It is stratified sandy loam, gravelly sandy loam, very gravelly sandy loam, and gravelly loamy sand.

Winnemucca Series

The Winnemucca series consists of very deep, well drained soils in mountain meadows. These soils formed in alluvium derived from basic and intermediate volcanic rock. Slopes are 5 to 30 percent. Elevation is 8,500 to 10,500 feet. Average annual precipitation is 20 to 30 inches, and average annual air temperature is 34 to 38 degrees F.

These soils are clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of a Winnemucca gravelly silt loam in an area of Callings-Winnemucca association, 5 to 15 percent slopes, on Winnemucca Flats, in the northwest corner of sec. 5, T. 32 S., R. 3 W.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; many very fine interstitial pores; 15 percent pebbles; slightly acid (pH 6.5); gradual smooth boundary.

A2—5 to 11 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate fine and medium granular; soft, friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; 15 percent pebbles and 5 percent cobbles; slightly acid (pH 6.5); clear wavy boundary.

BA—11 to 18 inches; brown (7.5YR 4/2) very cobbly clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common fine interstitial and tubular pores; few thin clay films on faces of peds; 25 percent cobbles, 5 percent stones, and 5 percent pebbles; slightly acid (pH 6.5); gradual wavy boundary.

Bt1—18 to 24 inches; reddish brown (5YR 5/4) very cobbly clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine roots; few coarse interstitial pores; many moderately thick clay films on faces of peds; 45 percent cobbles, 5 percent pebbles, and 5 percent stones; slightly acid (pH 6.5); gradual wavy boundary.

Bt2—24 to 28 inches; reddish brown (5YR 5/4) extremely cobbly clay loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; few coarse interstitial pores; few thin clay films in pores; 55 percent cobbles, 10 percent stones, and 5 percent pebbles; slightly acid (pH 6.5); gradual wavy boundary.

C—28 to 60 inches; light reddish brown (5YR 6/4) extremely stony loam, reddish brown (5YR 5/4) moist; massive; hard, firm, slightly sticky and nonplastic; few very fine roots; few coarse interstitial pores; 50 percent stones and 20 percent cobbles; neutral (pH 7.0).

The mollic epipedon is 16 to 22 inches thick. Depth to bedrock is estimated to be 6 to 15 feet.

The A and BA horizons have hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 or 3 when moist, and chroma of 2 or 3. The A horizon is gravelly silt loam or gravelly loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4. It is very cobbly clay loam, extremely cobbly clay loam, very cobbly clay, or cobbly clay. Clay content is 35 to 42 percent.

The C horizon has hue of 5YR or 7.5YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 3 or 4. It is extremely cobbly clay loam or extremely stony loam.

Yarts Series

The Yarts series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from sandstone and shale. Slopes are 1 to 10 percent. Elevation is 6,000 to 6,600 feet. Average annual precipitation is 9 to 12 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are coarse-loamy, mixed (calcareous), mesic Ustic Torriorthents.

Typical pedon of Yarts sandy loam, 2 to 5 percent slopes, about 2 miles southwest of Cannonville, in the SW¼ of sec. 36, T. 37 S., R. 3 W.

A—0 to 10 inches; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; soft, very friable, slightly sticky; common fine and medium roots; few fine and medium pores; slightly calcareous; moderately alkaline (pH 8.3); gradual wavy boundary.

C—10 to 60 inches; light reddish brown (5YR 6/4) fine sandy loam, reddish brown (5YR 5/4) moist; massive; soft, very friable, slightly sticky; few fine and medium roots; few fine and medium pores; slightly calcareous; moderately alkaline (pH 8.0).

Bedrock is at a depth of 60 inches or more.

The A horizon has hue of 5YR to 7.5YR, value of 5 or 6 when dry and 4 to 6 when moist, and chroma of 3 or 4. It is loam, sandy loam, or fine sandy loam.

The C horizon has value of 5 or 6 when dry and 3 to 5 when moist. It is loam or fine sandy loam. Clay content is 10 to 18 percent. The horizon is slightly calcareous or strongly calcareous.

Yenlo Series

The Yenlo series consists of very deep, well drained soils on fan terraces and structural benches. These soils formed in alluvium derived dominantly from sandstone, limestone, and shale. Slopes are 2 to 8 percent. Elevation is 6,300 to 7,200 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are fine-loamy, mixed, mesic Ustollic Haplargids.

Typical pedon of Yenlo loam, 2 to 8 percent slopes, about 7 miles northeast of Henrieville, about 300 feet north and 300 feet east of the southwest corner of sec. 1, T. 37 S., R. 1 W.

A—0 to 2 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few very fine and fine roots; many fine pores; 2 percent pebbles; mildly alkaline (pH 7.7); clear smooth boundary.

Bt1—2 to 10 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine pores; common moderately thick clay films on faces of peds; 2 percent pebbles; mildly alkaline (pH 7.7); clear smooth boundary.

Bt2—10 to 23 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; common very fine, fine, and medium roots and few coarse roots; common very fine and fine pores and few medium pores; common moderately thick clay films on faces of peds; 2 percent pebbles; mildly alkaline (pH 7.7); clear wavy boundary.

Bk1—23 to 42 inches; light yellowish brown (10YR 6/4) clay loam, brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; common fine and medium roots; common very fine and fine pores; 5 percent pebbles; moderately calcareous; carbonates are in veins and filaments; moderately alkaline (pH 8.4); clear wavy boundary.

Bk2—42 to 60 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine pores; 10 percent pebbles; moderately calcareous; carbonates are disseminated; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more.

The Bt horizon has chroma of 3 or 4. Clay content is 27 to 32 percent. Rock fragment content is 0 to 5 percent.

The Bk horizon has value of 6 or 7 when dry and 4 to 5 when moist, and it has chroma of 3 or 4. It is loam or clay loam. Clay content is 20 to 30 percent. Rock fragment content is 0 to 10 percent. Reaction is moderately alkaline or strongly alkaline.

Zillion Series

The Zillion series consists of very deep, well drained soils on mountainsides. These soils formed in alluvium derived dominantly from basic and intermediate igneous rock. Slopes are 5 to 25 percent. Elevation is 7,300 to 8,500 feet. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 44 degrees F.

These soils are loamy-skeletal, mixed Pachic Argiborolls.

Typical pedon of Zillion very cobbly loam, 5 to 25 percent slopes, about 6 miles northwest of Bear Valley Junction, about 1,000 feet south and 2,000 feet west of the northeast corner of sec. 8, T. 32 S., R. 5 W.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak thin platy structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine pores; 20 percent pebbles, 20 percent cobbles, and 1 percent stones; neutral (pH 7.2); clear smooth boundary.

BA—5 to 9 inches; dark brown (10YR 3/3) very gravelly clay loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; few fine pores; few thin clay films; 30 percent pebbles, 5 percent cobbles, and 1 percent stones; neutral (pH 7.3); clear smooth boundary.

Bt1—9 to 13 inches; brown (7.5YR 4/3) very gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; few fine pores; continuous thin clay films; 30 percent pebbles, 10 percent cobbles, and 1 percent stones; neutral (pH 7.0); clear smooth boundary.

Bt2—13 to 20 inches; brown (7.5YR 4/3) very gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; few fine pores; continuous thin clay films; 30 percent pebbles, 10 percent cobbles, and 1 percent stones; mildly alkaline (pH 7.4); clear smooth boundary.

Bk1—20 to 30 inches; grayish brown (10YR 5/2) very cobbly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few fine pores; 30 percent pebbles and 20 percent cobbles; strongly calcareous; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2—30 to 37 inches; white (10YR 8/1) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; weakly cemented to strongly cemented, very friable; few fine roots; few fine pores; 40 percent pebbles, 15 percent cobbles, and 2 percent stones; strongly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3—37 to 49 inches; white (10YR 8/1) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; weakly cemented to strongly cemented, very friable; few fine pores; 40 percent pebbles, 15 percent cobbles, and 2 percent stones; strongly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

C—49 to 60 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable; few fine pores; 40 percent pebbles, 15 percent cobbles, and 1 percent stones; moderately calcareous; strongly alkaline (pH 8.5).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 22 to 30 inches thick. The solum is 22 to 30 inches thick. The particle size control section is 35 to 45 percent rock fragments.

The Bt horizon has hue of 7.5YR, and it has chroma of 2 or 3. Clay content is 28 to 35 percent. Rock fragment content is 35 to 45 percent. Reaction is neutral or mildly alkaline.

The Bk and C horizons have value of 6 to 8 when dry and 4 to 6 when moist, and they have chroma of 1 to 3. They are very gravelly coarse sandy loam, very cobbly sand, or very cobbly loamy sand. Rock fragment content is 50 to 60 percent. These horizons are moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Zinzer Series

The Zinzer series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived dominantly from mixed sedimentary rock. Slopes are 3 to 15 percent. Elevation is 6,800 to 7,500 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are fine-loamy, mixed Aridic Calciborolls.

Typical pedon of Zinzer loam, 3 to 15 percent slopes, about 2 miles southwest of Panguitch, in the NE¼ of sec. 31, T. 34 S., R. 5 W.

A1—0 to 3 inches; brown (10YR 5/3) loam, dark brown (7.5YR 3/2) moist; moderate medium platy structure parting to moderate fine granular; slightly hard, friable, slightly sticky and plastic; few fine roots; common fine pores; 10 percent pebbles; mildly alkaline (pH 7.8); clear smooth boundary.

A2—3 to 12 inches; brown (10YR 5/3) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and plastic; common medium and fine roots; few very fine tubular pores; 5 percent pebbles; slightly calcareous; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk1—12 to 36 inches; light yellowish brown (10YR 6/4) clay loam, brown (10YR 4/3) moist; massive; very hard, friable, sticky and plastic; few fine roots; 5 percent pebbles; strongly calcareous; strongly alkaline (pH 8.6); gradual smooth boundary.

Bk2—36 to 60 inches; very pale brown (10YR 7/4) sandy loam, light brown (7.5YR 6/4) moist; massive; hard, very friable; few fine roots; 10 percent pebbles; very strongly calcareous; strongly alkaline (pH 8.6).

Bedrock is at a depth of 60 inches or more. The mollic epipedon is 7 to 12 inches thick. Secondary carbonates are at a depth of 10 to 15 inches. The particle size control section is 0 to 10 percent rock fragments.

The A horizon has chroma of 2 or 3. Rock fragment content is 5 to 10 percent. The horizon is slightly calcareous or moderately calcareous. Reaction is mildly alkaline to strongly alkaline.

The Bk horizon has hue of 10YR or 7.5YR, value of 6 or 7 when dry and 4 to 6 when moist, and chroma of 2 to 4. It is clay loam or sandy loam below a depth of 36 inches. Clay content is 10 to 35 percent, but it averages 18 to 35 percent in the particle size control section. Rock fragment content is 0 to 10 percent. The Bk horizon is moderately calcareous or strongly calcareous. Reaction is moderately alkaline or strongly alkaline.

Zyme Series

The Zyme series consists of shallow, well drained soils on mountainsides. These soils formed in residuum derived dominantly from shale. Slopes are 15 to 60 percent. Elevation is 6,300 to 7,200 feet. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 49 degrees F.

These soils are clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents.

Typical pedon of a Zyme clay in an area of Zyme-Lazear-Rock outcrop complex, 8 to 60 percent slopes, about 2 miles northwest of Tropic, in the SE¼ of sec. 22, T. 36 S., R. 3 W.

A—0 to 2 inches; light olive gray (5Y 6/2) clay, olive (5Y 5/3) moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; few fine roots; many fine pores; slightly calcareous; moderately alkaline (pH 8.0); clear smooth boundary.

C—2 to 11 inches; olive gray (5Y 5/2) clay, olive (5Y 4/3) moist; weak medium subangular blocky structure; hard, very firm, sticky and plastic; common fine and medium roots and few coarse roots; few fine and medium pores; slightly calcareous; moderately alkaline (pH 8.0); clear wavy boundary.

Cr—11 inches; shale.

Shale is at a depth of 10 to 20 inches.

The A horizon has hue of 5Y to 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 2 or 3. It is clay or very cobbly loam. Rock fragment content is 0 to 55 percent. The A horizon is slightly calcareous to strongly calcareous.

The C horizon has hue of 5Y to 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 2 or 3. Clay content is 40 to 50 percent. The C horizon is slightly calcareous to strongly calcareous.

Formation of the Soils

Soil is a natural, three-dimensional body on the Earth's surface that supports plants. A soil has properties that differ from those of the underlying bedrock or unconsolidated material. Properties of soils are a reflection of soil forming processes that are initiated and sustained by the effects of climate and living organisms acting on parent material and modified by relief over a period of time. In a given area, one factor may exert a stronger influence on soil formation than another, but the interaction of all the factors determines the kind of soil that forms.

In this survey, soil forming factors are discussed individually; however, there is a strong interdependence of all soil forming factors.

Parent Material

Parent material is the material in which soil forms. It can be material that has weathered in place or that has been transported by wind or water. In many of the soils in the survey area there is no distinct difference between the soil material in the lower part of the profile and the parent material. Parent material affects soil formation in several ways. It largely determines the texture, structure, consistency, and color of the soil. The kind of parent material also has a great deal of influence on the mineralogy of the soil.

Three major kinds of parent material are in the survey area—alluvium and colluvium derived from basic and intermediate igneous rock and from sedimentary rock, mainly sandstone and limestone; eolian material derived from fine grained sandstone; and residuum derived mainly from shale, sandstone, and limestone but also from igneous rock.

The soils that formed in alluvium derived from igneous rock are mainly in Panguitch and Johns Valleys. Notter, Widtsoe, Bruman, Zillion, Waltershow, Ipson, Tridell, and Showalter soils formed in gravelly alluvium. Alldown, Tebbs, and Jodero soils formed in moderately fine textured alluvium.

Bayfield, Baldfield, and Befar soils formed in fine textured alluvium derived from sedimentary rock. Tropic, Mitch, Frandsen, and Brycan soils formed in moderately fine textured alluvium. Soils that formed in gravelly alluvium derived from sedimentary rock are those of the Clapper, Guben, and Winetti series. Hernandez Family and Yenlo soils are on benches and fan terraces and have a Bk horizon. Yenlo soils also have a Bt horizon.

The soils that formed in eolian material are mainly in the Boulder area, but there are small areas near Cannonville and Escalante. Mespun soils are windblown. Yarts soils also have been altered by wind, but they have been altered to a lesser extent than the Mespun soils.

Cannonville, Sevier, Podo, Zyme, and Syrett soils formed in residuum derived from sedimentary rock. The Cannonville, Sevier, and Zyme soils formed in material derived from fine textured shale, and the Podo and Syrett soils formed in material derived from medium grained to coarse grained sandstone.

Soils such as those of the Redcreek and Dalcan series formed in residuum derived from basic and intermediate igneous rock. The Redcreek soils are relativity young and do not have any diagnostic horizons. The Dalcan soils have a well developed Bt horizon. Soils that are very high in content of lime formed in material derived from limestone in the Bryce Canyon and Johns Valley areas. Descot, Winetti, Codley, and Pahreah soils formed in this parent material.

Climate

The climate in the survey area ranges from semiarid at the lower elevations to moist and subhumid at the higher elevations. The effects of the temperature and moisture are influenced by aspect, elevation, and wind. In some areas the available moisture on northerly aspects at lower elevations is similar to that on southerly aspects at higher elevations (1,000 to 2,000 feet).

The influence of climate is expressed mainly in the amount of organic matter in the surface layer, the translocation of soluble salts, minerals, and clay, and the formation of distinct soil horizons. The translocation of minerals, salts, and clay is accomplished by the downward movement of water through the soil.

In the semiarid climate at lower elevations, where the precipitation is 8 to 12 inches annually, there has been only a moderate increase in the organic matter content of the surface layer. In soils such as those of the Befar series, some soluble salts have accumulated at a greater depth.

Where the climate is semiarid or dry and subhumid, the organic matter content of the surface layer is 1 to 2 percent. In the Bruman and Hernandez Family soils, a layer of calcium carbonate accumulation has formed and the soluble salts have moved deeper into the profile. In March, April, and May the areas that are arid and semiarid frequently are subject to winds of moderate to high velocity that dry the soils and increase the rates of evaporation and transpiration.

Where the climate is moist and subhumid, the soils have thick layers that are high in content of organic matter, are mainly on north aspects, and are not so steep. Many of these soils have a Bt horizon, and a few have an E horizon.

The climate in the central part of the survey area is characterized by a larger percentage of precipitation in fall, winter, and spring. This tends to cause a heavy snowpack to build up so that a higher percentage of the moisture passes through the soil. This movement of water leaches the calcium carbonate and clay deeper into the soil and thus creates a thick surface layer and Bt and E horizons. The calcium carbonate is leached to a depth of 60 inches or more in the Harol, Callings, Dalcan, and Winnemucca soils.

The cold temperatures and short growing season in the Panguitch, Antimony, and Johns Valley areas are the main limitations for crop production. The Tropic-Henrieville and Escalante-Boulder areas have an average annual temperature that is 4 to 5 degrees warmer, have about 40 to 50 more freeze-free days than the Panguitch, Johns Valley, and Antimony areas, and can produce a much wider variety of crops.

Relief

Drainage, elevation, aeration, aspect, steepness of slope, and susceptibility to erosion are factors related to relief that affect the soil forming process.

The dominant landforms or topographic features in the survey area are valley floors, valley plains, alluvial fans, fan terraces, hills, benches, and mountainsides.

Alldown, Tebbs, Tropic, Mitch, Shupert, and Baldwin soils are on valley floors and valley plains. Villy Family and Kade soils have a high water table and generally are mottled throughout the profile. The wetness and organic matter content of these soils cause a reduction of iron. A fluctuating water table causes air to oxidize the iron and produces yellowish mottles. When the amount of oxygen present has been severely limited by water, the iron is reduced and the soil material becomes gray or olive gray.

Notter, Osote, Tridell, Baldwin, Yarts, Henrieville, and Echard soils are on alluvial fans. The Notter and Echard soils are on the older fans and have a Bt horizon. The Tridell soils have a layer of lime accumulation but do not have a Bt horizon. The Osote, Baldwin, and Henrieville soils are on much younger fans and do not have any diagnostic horizons. The Mivida, Hernandez Family, and Mikim soils are on fan terraces, and the Cannonville soils are on shale hills. Relief has had little effect on the formation of these soils.

Aspect has had a significant effect on the climatic environment, vegetation, and other characteristics of the soils in the area. On the Paunsaugunt Plateau, the soils on steep north aspects commonly have a denser canopy of coniferous trees, lower temperatures, more effective moisture, and a more strongly developed profile than do the soils on steep south aspects.

The surface litter is thicker and the depth of the dark surface layer is greater on the north aspects. As elevation and precipitation decrease, the effect of exposure on vegetation and the soil climatic environment also decreases. In the 12- to 16-inch precipitation zone, pinyon and juniper most commonly are on north and east aspects, where the soils have a thicker and darker colored surface layer than is commonly present in soils on south and west aspects. In the 9- to 12-inch precipitation zone, the effect of exposure on the soil climatic environment is minimal.

A soil, vegetation, and soil climatic environment relationship exists in areas where the soils formed in volcanic material above an elevation of 8,500 to 10,500 feet. Behanin soils on steep north aspects exhibit less translocation of silicate clay than do Ess soils on south aspects. Behanin soils have a dense canopy of spruce-subalpine fir, a layer of coniferous litter, a dark-colored surface layer more than 15 inches thick, and a Bw horizon that exhibits very little translocation of silicate clay. Ess soils support grasses and have a thin, discontinuous layer of litter, a dark-colored surface layer less than 15 inches thick, and a Bt horizon that exhibits significant translocation of silicate clay. Behanin soils appear to exhibit less translocation of silicate clay because of the short period of time during the year when the temperature is high enough for the weathering and movement of clay.

Living Organisms

The natural vegetation in the survey area ranges from a sparse stand of shrubs and grasses on some of the soils at lower elevations to dense stands of aspen, ponderosa pine, and mixed conifers on the soils at higher elevations.

Because vegetation on soils such as those of the Baldwin, Beals, and Cannonville series is sparse, there is very little organic matter throughout the profile. In areas where there is a high water table the soils support a dense stand of sedges and grasses and have 3 to 5 percent organic matter in the upper 16 to 24 inches of the profile. Examples of these soils are those of the Villy Family and the Kade series.

Soils that formed in areas of rangeland under shrubs and grasses such as the Mauser, Yenlo, and Hernandez Family soils have a moderate amount of organic matter in the surface layer. In some areas the rangeland has been overgrazed, which has caused the desirable grasses to decrease and the undesirable shrubs to increase.

Pinyon and juniper trees affect the soil by reducing the amount and kind of understory plants that grow. Much of the soil surface under these trees has few if any understory plants. These soils have low organic matter content and are more susceptible to erosion. Examples of these are Ipson, Tridell, Podo, and Clapper soils. Because of overgrazing, pinyon and juniper have invaded sites that normally would produce grasses and some shrubs. Yenlo, Mikim, and Hernandez Family soils are examples of soils on which this situation exists.

The soils on mountains formed under various kinds of vegetation. The Behanin and Echard soils formed under spruce and fir trees. These soils are slightly acid or neutral because the decomposition of spruce and fir needles produces acid that reduces the soil reaction. These soils also have a thin, dark-colored surface layer overlying an E horizon.

Callings and Skutum soils formed under aspen trees. These soils have a thick, dark-colored surface layer and are slightly acid to neutral.

Burrowing animals, cicadas, earthworms, and other insects influence the soil forming process. They mix the soil and thus retard horizon formation in some places. These living organisms influence the soil structure and porosity and thus influence the rate at which air and water move through the soil.

Farmers affect the soil formation processes by tilling and irrigating. The crops grown on irrigated soils, such as those of the Alldown, Tebb, and Greenhalgh series, often produce large amounts of organic matter that is returned to the soils. Most of the irrigated soils in the survey area were apparently well drained before they were irrigated. Because of irrigation, a high water table has developed and some salts have accumulated in the soils, resulting in the formation of the somewhat poorly drained, saline soils of the Villy Family and the Neto series.

Time

The kinds of horizons in soils and the degree of expression of these horizons depend in part upon the time that has been available for their development. The soils of the survey area range from young to old in degree of soil development.

The youngest soils in degree of horizonation are the recent alluvial soils such as those of the Neto, Greenhalgh, Plite, and Mitch series. These soils periodically receive additional fresh sediment from water overflow along the bottom lands and flood plains. As a consequence, the time for differentiation of horizons in these soils has been short. Some organic matter has accumulated in the surface layer, but further differentiation between the horizons is a result of stratification caused by periodic deposition of additional sediment.

The oldest soils in degree of expression of their horizons are soils of the Harol, Sielo, Dalcan, Quilt, Bushvalley, and Callings series. Sielo soils appear to be on one of the more stable and older land surfaces in the area. These soils are on relatively flat mesa tops in the southern and western parts of the Paunsaugunt Plateau. They formed in material of the Claron Formation. These soils are strongly developed and have a bleached E horizon and exhibit a maximum translocation of silicate clay from the E horizon to the Bt horizon. The reaction is medium acid in the surface layer. Callings, Harol, and Quilt soils formed in material derived from volcanic rock of a more recent age but have a comparable degree of expression of the horizons.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vol., illus.

(2) American Society for Testing and Materials. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D. 2487.

(3) Portland Cement Association. 1962. PCA soil primer. 52 pp., illus.

(4) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962)

(5) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(6) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(7) United States Department of Community and Economic Development. 1983. Garfield County master plan.

(8) Utah Department of Natural Resources. 1975. Geology and mineral resources of Garfield County, Utah. UT Geol. Miner. Surv. Bull. 107.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep to very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4½ feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition of woody vegetation to allow understory grasses and forbs to recover, or to make conditions favorable for reseeding. It increases production of forage, which reduces erosion. Brush management may improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion or an exposed volcanic neck.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid. The degree of effervescence is expressed as—

Slightly calcareous	bubbles form readily
Moderately calcareous	bubbles form low foam slowly
Strongly calcareous	bubbles form low foam
Very strongly calcareous	bubbles form thick foam quickly

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter, in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay skin. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay film.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. If soil improving crops and practices used in the system more than offset the soil depleting crops and deteriorating practices, then it is a good conservation cropping system. Cropping systems are needed on all tilled soils. Soil improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coppice dune. A small dune of fine-grained soil material stabilized around shrubs or small trees.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops using a planned system of rotation and management practices.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. A layer of gravel or coarser fragments on a desert soil surface that was emplaced by upward movement of fragments from underlying sediment or remains after finer particles have been removed by running water or wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and low water holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. They are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley, generally more open and with broader bottom land than a ravine or gulch.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature; for example, fire that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. Synonym: scarp.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (or 300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard rock. Rock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Crops such as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well-defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color in hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed. (See climax plant community.)

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This increases the vigor and reproduction of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables.) Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sensitive plant species. Plant species for which population viability is a concern.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site class. A grouping of site indexes into 5 to 7 production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve.

The basis of the curves is the height of dominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that show the average height of dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level	0 to 1
Gently sloping	1 to 3
Moderately sloping	3 to 8
Strongly sloping	8 to 16
Moderately steep	16 to 30
Steep	30 to 60
Very steep	60 and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are—

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft rock. Rock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest.

during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep, rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Data recorded at Bryce Canyon National Park Headquarters; elevation, 7,915 feet)

Month	Temperature 1/			Precipitation			
				Rainfall 2/		Snowfall 3/	
	Maximum	Minimum	Average	Average	Highest	Average	Highest
	°F	°F	°F	In	In	In	In
January---	36.0	8.1	22.1	1.41	2.08	17.5	63.0
February--	39.1	10.8	25.0	1.45	1.98	17.2	53.0
March-----	43.9	15.7	29.8	1.65	3.08	19.8	74.5
April-----	53.4	22.8	38.1	1.02	1.19	8.2	61.8
May-------	63.7	25.7	44.7	0.93	1.04	2.3	17.5
June------	74.1	37.6	55.9	0.64	1.51	0.2	1.0
July------	80.3	45.5	62.9	1.39	1.00	0.0	4/
August----	77.2	44.1	60.7	2.25	3.81	0.0	4/
September-	71.2	36.3	53.8	1.59	4.09	0.2	4.0
October---	59.5	26.9	43.2	1.44	2.07	2.8	21.5
November--	45.2	16.9	31.1	1.15	2.05	10.5	37.4
December--	38.1	10.6	24.4	1.31	2.60	16.1	46.7
Year------	56.8	25.1	41.0	16.23	4.09	94.8	74.5

1/ Recorded in the period 1943-84.
2/ Recorded in the period 1916-84.
3/ Recorded in the period 1925-84.
4/ Trace.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

(Data recorded at Bryce Canyon FAA Airport; elevation, 7,585 feet)

	Temperature 1/			Precipitation			
				Rainfall 2/		Snowfall 3/	
Month	Maximum	Minimum	Average	Average	Highest	Average	Highest
	°F	°F	°F	In	In	In	In
January---	36.6	4.9	20.3	0.83	1.05	12.3	44.1
February--	38.7	8.5	23.6	1.01	1.77	12.7	40.9
March-----	43.4	14.5	29.0	0.97	0.72	12.4	45.5
April-----	52.6	22.1	37.4	0.72	0.82	6.2	36.1
May-------	63.0	29.5	46.3	0.88	1.58	5.9	15.5
June------	73.7	35.9	54.8	0.51	0.99	0.0	1.0
July------	80.1	44.1	62.1	1.12	1.42	0.0	0.0
August----	77.0	43.0	60.0	1.74	1.40	0.0	0.0
September-	70.6	34.9	52.8	1.25	2.16	0.5	8.0
October---	59.9	26.0	43.0	1.01	1.94	2.5	16.8
November--	45.2	15.3	30.3	0.94	1.60	8.1	39.8
December--	37.4	7.0	22.2	0.95	0.91	9.9	33.1
Year------	56.4	23.8	40.1	11.93	2.16	70.5	45.5

1/ Recorded in the period 1950-80.
2/ Recorded in the period 1905-84.
3/ Recorded in the period 1905-75.
4/ Trace.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

(Data recorded at Panguitch; elevation, 6,720 feet)

	Temperature 1/			Precipitation			
				Rainfall 2/		Snowfall 3/	
Month	Maximum	Minimum	Average	Average	Highest	Average	Highest
	°F	°F	°F	In	In	In	In
January---	38.9	6.4	22.7	0.64	1.27	7.5	32.0
February--	42.6	12.1	27.4	0.60	1.03	5.4	23.5
March-----	49.0	18.6	33.8	0.83	1.90	5.8	24.0
April-----	59.6	24.2	41.9	0.64	1.20	1.5	9.0
May-------	68.6	31.0	49.8	0.68	1.44	0.3	4.0
June------	77.2	37.6	57.4	0.49	0.87	0.0	1.0
July------	83.5	45.3	64.4	1.52	1.85	0.0	0.0
August----	81.2	43.7	62.5	1.54	1.40	0.0	0.0
September-	75.3	35.1	55.2	1.00	1.88	0.0	4/
October---	64.9	25.5	45.2	0.86	1.20	1.3	24.0
November--	51.3	16.3	33.8	0.60	1.17	5.2	15.0
December--	40.9	9.1	25.0	0.59	0.95	5.3	14.8
Year------	61.1	25.4	43.3	9.99	1.85	32.3	32.0

1/ Recorded in the period 1911-84.
2/ Recorded in the period 1905-84.
3/ Recorded in the period 1905-75.
4/ Trace.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

(Data recorded at Tropic; elevation, 6,280 feet)

Month	Temperature 1/			Precipitation			
				Rainfall 2/		Snowfall 3/	
	Maximum	Minimum	Average	Average	Highest	Average	Highest
	°F	°F	°F	In	In	In	In
January---	41.2	14.9	28.1	1.14	4.50	10.9	58.0
February--	44.8	18.7	31.8	1.02	1.80	9.3	48.0
March-----	51.6	24.4	38.0	1.06	2.53	6.3	30.0
April-----	60.3	30.4	45.4	0.72	1.19	2.2	15.0
May-------	69.8	36.6	53.2	0.65	0.94	0.2	8.0
June------	80.0	43.4	61.7	0.47	1.43	0.0	4/
July------	85.3	51.2	68.3	1.22	1.92	0.0	0.0
August----	82.0	49.7	66.0	1.84	2.08	0.0	0.0
September-	76.7	41.9	59.3	1.29	2.70	0.0	4/
October---	66.1	33.1	49.6	1.09	2.19	0.3	6.0
November--	52.8	23.5	38.2	0.77	1.57	2.4	37.0
December--	43.7	17.2	30.5	1.07	2.11	7.5	50.0
Year------	62.9	32.1	47.5	12.34	4.50	39.1	58.0

1/ Recorded in the period 1897-1984.
2/ Recorded in the period 1889-1984.
3/ Recorded in the period 1897-1984.
4/ Trace.

TABLE 2.--ESTIMATED PAN EVAPORATION AT SELECTED STATIONS [1]

Month	Bryce Canyon FAA Airport	Bryce Canyon National park Headquarters	Panguitch	Tropic
May-------	5.52	5.55	5.46	6.60
June------	7.14	7.14	7.52	8.56
July------	8.28	8.26	9.26	9.73
August----	6.76	6.76	7.49	7.80
September-	5.28	5.09	5.86	6.03
October---	3.48	3.32	4.20	4.11
Total-----	36.46	36.12	39.79	42.83

[1] Estimated pan evaporation assumes that the soil is barren. To estimate pan evaporation where extensive plant cover is present, reduce table values by 10 to 15 percent.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Garfield County	Iron County	Kane County	Piute County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Acres	Acres	Pct
1	Ahlstrom-Osote complex, 1 to 15 percent slopes	5,566	0	241	0	5,807	0.7
2	Alldown clay loam, 1 to 2 percent slopes	2,441	0	0	0	2,441	0.3
3	Alldown clay loam, 2 to 5 percent slopes	1,358	0	0	0	1,358	0.2
4	Alldown loam, alkali, 1 to 2 percent slopes	752	0	0	0	752	0.1
5	Alldown clay loam, moist, 2 to 5 percent slopes	1,211	0	0	0	1,211	0.1
6	Andys loam, 2 to 15 percent slopes	2,902	0	0	0	2,902	0.3
7	Andys very cobbly loam, 8 to 25 percent slopes	3,017	0	0	0	3,017	0.3
8	Badland-Cannonville-Rock outcrop complex, 30 to 50 percent slopes	14,191	0	6,295	0	20,486	2.3
9	Badland-Rock outcrop-Paunsaugunt complex, 2 to 20 percent slopes	56,172	0	0	0	56,172	6.4
10	Baldfield clay, 2 to 4 percent slopes	1,090	0	0	0	1,090	0.1
11	Baldfield clay, 2 to 8 percent slopes, eroded	3,155	0	0	0	3,155	0.4
12	Barx fine sandy loam, 2 to 10 percent slopes	4,800	0	0	0	4,800	0.5
13	Bayfield clay, 2 to 8 percent slopes	1,556	0	0	0	1,556	0.2
14	Befar clay, 4 to 8 percent slopes	3,822	0	0	0	3,822	0.4
15	Behanin loam, 30 to 70 percent slopes	27,841	0	534	0	28,375	3.2
16	Blanchard Family sand, 30 to 70 percent slopes	101	0	478	0	579	0.1
17	Borollic Natrargids, 0 to 1 percent slopes	378	0	0	0	378	*
18	Broncho very gravelly sandy loam, 2 to 5 percent slopes	1,531	0	0	0	1,531	0.2
19	Bruman loam, 2 to 5 percent slopes	803	0	0	0	803	0.1
20	Bruman gravelly loam, 2 to 10 percent slopes	9,351	0	0	0	9,351	1.1
21	Bruman cobbly loam, moist, 10 to 30 percent slopes	2,113	0	0	0	2,113	0.2
22	Bruman cobbly loam, moist, 30 to 50 percent slopes	997	0	0	0	997	0.1
23	Bruman very cobbly loam, 5 to 30 percent slopes	7,786	0	0	0	7,786	0.9
24	Bruman very cobbly loam, 30 to 50 percent slopes	3,362	0	0	0	3,362	0.4
25	Brycan very fine sandy loam, 1 to 6 percent slopes	2,686	0	0	0	2,686	0.3
26	Brycan very fine sandy loam, 6 to 15 percent slopes	1,395	0	0	0	1,395	0.2
27	Bushvalley very stony loam, 15 to 40 percent slopes	3,213	0	0	0	3,213	0.4
28	Callings-Winnemucca association, 5 to 15 percent slopes	11,456	0	0	345	11,801	1.3
29	Cannonville clay, 30 to 50 percent slopes	6,425	0	0	0	6,425	0.7
30	Cannonville very stony clay, 30 to 50 percent slopes	1,580	0	0	0	1,580	0.2
31	Castino-Behanin association, 20 to 70 percent slopes	6,385	0	0	0	6,385	0.7
32	Castino-Tica Family complex, 20 to 70 percent slopes	36,124	0	0	724	36,848	4.2
33	Castino-Winnemucca association, 5 to 30 percent slopes	3,376	0	0	520	3,896	0.4
34	Circleville-Rock outcrop complex, 25 to 60 percent slopes	32,892	0	0	370	33,262	3.8
35	Clapper cobbly loam, 5 to 30 percent slopes	1,361	0	0	0	1,361	0.2
36	Clapper cobbly loam, 30 to 60 percent slopes	1,480	0	0	0	1,480	0.2
37	Codley silt loam, 1 to 2 percent slopes	13,993	0	0	0	13,993	1.6
38	Codley silt loam, 2 to 5 percent slopes	1,884	0	0	0	1,884	0.2
39	Comodore-Rock outcrop complex, 15 to 40 percent slopes	11,577	2,253	0	0	13,830	1.6
40	Crestline fine sandy loam, 2 to 4 percent slopes	1,798	0	0	0	1,798	0.2
41	Dalcan very cobbly loam, dry, 4 to 25 percent slopes	4,440	0	0	22	4,462	0.5
42	Descot silt loam, dry, 1 to 2 percent slopes	1,353	0	0	0	1,353	0.2
43	Descot silt loam, 2 to 5 percent slopes	3,036	0	0	0	3,036	0.3
44	Dimyaw Family gravelly loam, 4 to 25 percent slopes, eroded	1,404	0	0	0	1,404	0.2
45	Echard loam, 5 to 30 percent slopes	1,737	0	0	0	1,737	0.2

See footnote at end of table.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Garfield County	Iron County	Kane County	Piute County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Acres	Acres	Pct
46	Ess-Callings association, 15 to 45 percent slopes	23,845	0	0	0	23,845	2.7
47	Evanston loam, 2 to 8 percent slopes	2,383	0	0	0	2,383	0.3
48	Evanston very cobbly loam, 4 to 25 percent slopes	1,347	0	0	0	1,347	0.2
49	Frandsen loam, dry, 1 to 15 percent slopes	11,827	0	0	0	11,827	1.3
50	Frandsen-Neto association, 1 to 8 percent slopes	2,335	0	349	0	2,684	0.3
51	Frandsen, dry-Wiggler complex, 15 to 50 percent slopes	2,251	0	0	0	2,251	0.3
52	Fughes silty clay loam, 0 to 4 percent slopes	2,059	0	0	0	2,059	0.2
53	Gerst Family-Rock outcrop complex, 20 to 70 percent slopes	1,112	0	0	0	1,112	0.1
54	Greenhalgh silt loam, 1 to 2 percent slopes	830	0	0	0	830	0.1
55	Greenhalgh silt loam, 2 to 5 percent slopes	3,769	0	0	0	3,769	0.4
56	Grimm sandy loam, 1 to 5 percent slopes	3,603	0	0	0	3,603	0.4
57	Guben gravelly loam, dry, 1 to 25 percent slopes	3,939	0	1,423	0	5,362	0.6
58	Guben-Showalter complex, 2 to 30 percent slopes	19,840	0	0	0	19,840	2.3
59	Harol very cobbly loam, 2 to 15 percent slopes	5,599	383	0	0	5,982	0.7
60	Harol very cobbly loam, 15 to 40 percent slopes	8,448	0	0	0	8,448	1.0
61	Harol very cobbly loam, moist, 25 to 50 percent slopes	2,354	0	0	0	2,354	0.3
62	Hatch-Pahreah complex, 5 to 25 percent slopes	854	0	1,486	0	2,340	0.3
63	Hatch-Swapps complex, 5 to 25 percent slopes	569	0	2,632	0	3,201	0.4
64	Henrieville sandy loam, 1 to 2 percent slopes	2,315	0	0	0	2,315	0.3
65	Henrieville sandy loam, 2 to 5 percent slopes	1,502	0	0	0	1,502	0.2
66	Henrieville sandy loam, 5 to 10 percent slopes	761	0	0	0	761	0.1
67	Henrieville sandy loam, moist, 2 to 8 percent slopes	676	0	0	0	676	0.1
68	Hernandez Family-Clapper complex, 2 to 8 percent slopes	2,324	0	0	0	2,324	0.3
69	Ipson cobbly loam, 8 to 25 percent slopes	12,506	250	0	0	12,756	1.4
70	Ipson very cobbly loam, 25 to 60 percent slopes	7,608	0	0	0	7,608	0.9
71	Ipson very stony loam, dry, 5 to 25 percent slopes	2,746	0	0	0	2,746	0.3
72	Jodero loam, 1 to 2 percent slopes	4,789	0	0	0	4,789	0.5
73	Jodero loam, moist, 2 to 8 percent slopes	622	0	0	0	622	0.1
74	Kade silt loam, 0 to 2 percent slopes	2,126	0	715	0	2,841	0.3
75	Lava flows	263	0	0	0	263	*
76	Lazear-Rock outcrop-Badland complex, 8 to 20 percent slopes	2,705	0	0	0	2,705	0.3
77	Losee gravelly loam, 3 to 15 percent slopes	1,767	0	1,238	0	3,005	0.3
78	Losee gravelly sandy loam, dry, 10 to 25 percent slopes	673	0	574	0	1,247	0.1
79	Losee very gravelly loam, 30 to 60 percent slopes	1,780	0	154	0	1,934	0.2
80	Luhon loam, 2 to 5 percent slopes	3,093	0	0	0	3,093	0.4
81	Luhon loam, gravelly substratum, 1 to 2 percent slopes	325	0	0	0	325	*
82	Luhon loam, gravelly substratum, 2 to 5 percent slopes	293	0	0	0	293	*
83	Luhon loam, moist, 3 to 15 percent slopes	3,185	75	0	0	3,260	0.4
84	Luhon very cobbly sandy loam, 2 to 15 percent slopes	1,871	0	0	0	1,871	0.2
85	Mespun loamy fine sand, 1 to 3 percent slopes	1,154	0	0	0	1,154	0.1
86	Mespun loamy fine sand, 3 to 8 percent slopes	630	0	0	0	630	0.1
87	Mespun loamy fine sand, 8 to 15 percent slopes	1,075	0	0	0	1,075	0.1
88	Mikim sandy loam, 2 to 8 percent slopes	4,030	0	0	0	4,030	0.5
89	Mikim loam, dry, 1 to 2 percent slopes	1,660	0	0	0	1,660	0.2
90	Mikim loam, 2 to 4 percent slopes	593	0	0	0	593	0.1
91	Mikim clay loam, dry, 1 to 2 percent slopes	3,263	0	0	0	3,263	0.4
92	Mikim clay loam, dry, 2 to 5 percent slopes	2,645	0	0	0	2,645	0.3
93	Mitch silt loam, 0 to 3 percent slopes	2,742	0	0	0	2,742	0.3
94	Mitch-Riverwash association, 0 to 3 percent slopes	1,800	0	0	0	1,800	0.2
95	Mivida fine sandy loam, 2 to 20 percent slopes	1,392	0	0	0	1,392	0.2

See footnote at end of table.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Garfield County	Iron County	Kane County	Piute County	Total--	
						Area	Extent
		Acres	Acres	Acres	Acres	Acres	Pct
96	Neto fine sandy loam, 1 to 5 percent slopes	2,868	0	209	0	3,077	0.3
97	Neto very fine sandy loam, wet, 0 to 2 percent slopes	942	0	0	0	942	0.1
98	Notter loam, 1 to 4 percent slopes	2,464	0	0	0	2,464	0.3
99	Notter loam, moist, 1 to 8 percent slopes	3,191	0	0	0	3,191	0.4
100	Notter loam, thick surface, 4 to 8 percent slopes	2,740	96	0	0	2,836	0.3
101	Notter gravelly coarse sandy loam, 2 to 8 percent slopes	13,635	0	0	0	13,635	1.5
102	Notter gravelly loam, 8 to 25 percent slopes	5,449	15	0	0	5,464	0.6
103	Notter very cobbly loam, 4 to 25 percent slopes	5,651	0	0	0	5,651	0.6
104	Notter Variant loam, 1 to 4 percent slopes	882	0	0	0	882	0.1
105	Pahreah-Sheege complex, 1 to 20 percent slopes	732	0	0	0	732	0.1
106	Pahreah-Sielo complex, 2 to 25 percent slopes	999	0	1,088	0	2,087	0.2
107	Pahreah-Swapps complex, 25 to 65 percent slopes	9,038	0	12,220	0	21,258	2.4
108	Panguitch-Mitch association, 0 to 5 percent slopes	4,662	0	0	0	4,662	0.5
109	Panguitch-Riverwash association, 5 to 15 percent slopes	4,555	0	0	0	4,555	0.5
110	Paunsaugunt gravelly loam, 2 to 15 percent slopes	3,842	0	0	0	3,842	0.4
111	Paunsaugunt-Syrett gravelly loams, 2 to 20 percent slopes	2,435	0	0	0	2,435	0.3
112	Playas	1,195	0	0	0	1,195	0.1
113	Plite sandy loam, 2 to 8 percent slopes	5,200	640	0	0	5,840	0.7
114	Podo loamy sand, 1 to 12 percent slopes	1,781	0	0	0	1,781	0.2
115	Podo-Wiggler complex, 10 to 50 percent slopes	2,146	0	0	0	2,146	0.2
116	Podo-Rock outcrop complex, 10 to 40 percent slopes	7,298	0	222	0	7,520	0.9
117	Quilt very cobbly loam, 4 to 25 percent slopes	10,877	0	222	0	11,099	1.3
118	Quilt very cobbly loam, 25 to 40 percent slopes	1,385	0	0	0	1,385	0.2
119	Redcreek gravelly sandy loam, dry, 10 to 40 percent slopes	2,655	0	0	0	2,655	0.3
120	Redcreek cobbly loam, 15 to 50 percent slopes	3,677	0	0	0	3,677	0.4
121	Riverwash	3,588	0	0	0	3,588	0.4
122	Rock outcrop	13,009	120	3,783	0	16,912	1.9
123	Rock outcrop-Podo complex, 40 to 70 percent slopes	6,179	0	0	0	6,179	0.7
124	Rubble land	12,203	7	965	0	13,175	1.5
125	Ruko clay loam, 30 to 60 percent slopes	2,080	0	0	0	2,080	0.2
126	Ruko-Podo complex, 15 to 60 percent slopes	5,492	0	13,750	0	19,242	2.2
127	Schauson loam, 2 to 4 percent slopes	2,185	0	0	0	2,185	0.2
128	Schauson loam, 4 to 15 percent slopes	2,202	0	0	0	2,202	0.2
129	Sevier-Skutum association, 5 to 35 percent slopes	3,137	0	750	0	3,887	0.4
130	Sheege-Swapps complex, 30 to 50 percent slopes	0	0	1,269	0	1,269	0.1
131	Showalter-Guben complex, dry, 0 to 8 percent slopes	6,453	0	0	0	6,453	0.7
132	Shupert silty clay loam, wet, 0 to 1 percent slopes	2,533	0	0	0	2,533	0.3
133	Sielo very fine sandy loam, 2 to 12 percent slopes	167	0	4,209	0	4,376	0.5
134	Skutum very fine sandy loam, 1 to 6 percent slopes	628	0	1,155	0	1,783	0.2
135	Skutum fine sandy loam, 10 to 35 percent slopes	0	0	3,050	0	3,050	0.3
136	Swapps gravelly loam, 5 to 25 percent slopes	461	0	770	0	1,231	0.1
137	Swapps gravelly loam, 25 to 65 percent slopes	796	0	1,420	0	2,216	0.3
138	Syrett gravelly loam, 2 to 12 percent slopes	3,008	0	0	0	3,008	0.3
139	Syrett-Frandsen association, 1 to 12 percent slopes	1,774	0	0	0	1,774	0.2
140	Syrett-Vanet gravelly loams, 20 to 40 percent slopes	8,666	0	4,767	0	13,433	1.5
141	Tebbs sandy loam, 2 to 5 percent slopes	9,866	0	0	0	9,866	1.1
142	Tebbs loam, 1 to 2 percent slopes	4,480	0	0	0	4,480	0.5
143	Tebbs loam, moist, 1 to 2 percent slopes	774	0	0	0	774	0.1

See footnote at end of table.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Garfield County	Iron County	Kane County	Piute County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Acres	Acres	Pct
144	Tolman very cobbly silt loam, 8 to 35 percent slopes	3,793	0	0	0	3,793	0.4
145	Tolman-Rock outcrop complex, 25 to 40 percent slopes	13,669	389	0	0	14,058	1.6
146	Tridell loam, 2 to 4 percent slopes	584	0	0	0	584	0.1
147	Tridell gravelly loam, moist, 4 to 25 percent slopes	6,565	0	0	0	6,565	0.7
148	Tridell cobbly loam, 4 to 25 percent slopes	6,845	122	0	0	6,967	0.8
149	Tridell, moist-Rock outcrop complex, 25 to 50 percent slopes	3,313	0	0	0	3,313	0.4
150	Ustic Torrifluvents, occasionally flooded, 2 to 8 percent slopes	775	0	0	0	775	0.1
151	Venture cobbly loam, 4 to 30 percent slopes	2,783	0	0	0	2,783	0.3
152	Venture very cobbly silt loam, 4 to 25 percent slopes	3,683	0	0	0	3,683	0.4
153	Venture cobbly loam, dry, 8 to 25 percent slopes	1,606	0	0	0	1,606	0.2
154	Villy Family silty clay loam, 0 to 2 percent slopes	6,618	0	0	0	6,618	0.8
155	Waltershow extremely cobbly loam, 8 to 40 percent slopes	12,510	745	0	0	13,255	1.5
156	Waltershow extremely cobbly loam, 40 to 60 percent slopes	1,174	0	0	0	1,174	0.1
157	Waltershow-Venture-Rock outcrop complex, 4 to 40 percent slopes	9,137	25	0	0	9,162	1.0
158	Whiteman very cobbly very fine sandy loam, 1 to 6 percent slopes	2,432	0	807	0	3,239	0.4
159	Whiteman-Skutum association, 10 to 70 percent slopes	764	0	746	0	1,510	0.2
160	Widtsoe gravelly sandy loam, 8 to 40 percent slopes	15,116	0	0	579	15,695	1.8
161	Wiggler channery loam, 20 to 50 percent slopes	1,914	0	0	0	1,914	0.2
162	Wiggler-Guben complex, 25 to 50 percent slopes	4,343	0	0	0	4,343	0.5
163	Wiggler-Rock outcrop-Podo complex, 50 to 70 percent slopes	2,460	0	0	0	2,460	0.3
164	Winetti gravelly sandy loam, 2 to 7 percent slopes	0	0	4,159	0	4,159	0.5
165	Winnemucca-Hoodle association, 5 to 30 percent slopes	12,417	0	0	0	12,417	1.4
166	Yarts loam, 1 to 2 percent slopes	1,248	0	0	0	1,248	0.1
167	Yarts sandy loam, 2 to 5 percent slopes	1,778	0	0	0	1,778	0.2
168	Yarts sandy loam, 5 to 10 percent slopes	1,550	0	0	0	1,550	0.2
169	Yenlo loam, 2 to 8 percent slopes	2,462	0	0	0	2,462	0.3
170	Zillion very cobbly loam, 5 to 25 percent slopes	5,624	0	0	0	5,624	0.6
171	Zinzer loam, 3 to 15 percent slopes	4,013	0	0	0	4,013	0.5
172	Zyme very cobbly loam, 30 to 60 percent slopes	2,068	0	0	0	2,068	0.2
173	Zyme-Lazear-Rock outcrop complex, 8 to 60 percent slopes	2,606	0	0	0	2,606	0.3
	Water	523	0	0	0	523	0.1
	Total	802,122	5,120	71,680	2,560	881,482	100.0

* Less than 0.1 percent.

TABLE 4.--YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. Yields are for irrigated soil)

Soil name and map symbol	Alfalfa hay	Barley	Corn silage	Pasture
	Tons	Bu	Tons	AUM*
2, 3 Alldown	4.0	75	---	---
5 Alldown	4.0	75	---	---
10, 11 Baldfield	3.5	---	---	3.5
19 Bruman	3.0	55	---	---
25 Brycan	3.0	30	---	4.0
37, 38 Codley	4.0	75	---	4.0
42, 43 Descot	4.0	75	---	4.0
54, 55 Greenhalgh	4.0	75	---	---
64 Henrieville	5.0	90	22	4.0
65 Henrieville	4.0	85	20	3.5
72, 73 Jodero	4.0	75	---	4.0
81, 82 Luhon	3.5	60	---	---
85, 86 Mespun	4.5	90	---	3.5
89 Mikim	6.0	95	20	4.0
90 Mikim	5.0	95	20	3.5
91 Mikim	6.0	95	20	4.0
92 Mikim	5.5	95	20	3.5
95 Mivida	5.5	95	---	4.0
98 Notter	3.0	65	---	3.5

See footnote at end of table.

TABLE 4.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Barley	Corn silage	Pasture
	Tons	Bu	Tons	AUM*
99----- Notter	3.0	60	---	3.5
100----- Notter	4.0	75	---	3.5
101, 102----- Notter	3.0	60	---	3.5
113----- Plite	4.0	75	---	4.0
132----- Shupert	2.5	---	---	3.5
141, 142, 143----- Tebbs	4.0	75	---	4.0
146----- Tridell	3.5	60	---	3.5
154----- Villy	---	---	---	5.0
166----- Yarts	5.0	90	22	4.0
167----- Yarts	4.0	85	20	3.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION

(Only the soils that support vegetation suitable for grazing are listed)

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
1*:					
Ahlstrom	Mountain Loam (Black Sagebrush).	Favorable	1,600	Black sagebrush	20
		Normal	1,100	Nodding bromegrass	15
		Unfavorable	900	Nevada bluegrass	10
				Western wheatgrass	10
				Letterman needlegrass	5
				Aster	5
				Douglas rabbitbrush	5
Osote	Mountain Loam (Black Sagebrush).	Favorable	1,600	Black sagebrush	20
		Normal	1,100	Nodding bromegrass	15
		Unfavorable	900	Nevada bluegrass	10
				Western wheatgrass	10
				Letterman needlegrass	5
				Aster	5
				Douglas rabbitbrush	5
2, 3 Alldown	Semidesert Loam (Basin Big Sagebrush).	Favorable	1,100	Indian ricegrass	15
		Normal	900	Basin big sagebrush	15
		Unfavorable	800	Needleandthread	10
				Blue grama	10
				Western wheatgrass	10
				Wyoming big sagebrush	10
				Winterfat	5
4 Alldown	Loamy Bottom	Favorable	2,000	Basin wildrye	40
		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
5 Alldown	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
6 Andys	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
7 Andys	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
8*:					
Badland.					

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
8*:					
Cannonville	Semidesert Shallow Clay	Favorable	300	Indian ricegrass	15
		Normal	150	Bottlebrush squirreltail	10
		Unfavorable	50	Corymbed wildbuckwheat	10
				Roundleaf buffaloberry	10
				Eriogonum	10
				Black sagebrush	10
				Shadscale	10
Rock outcrop.					
9*:					
Badland.					
Rock outcrop.					
Paunsaugunt	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
10, 11 Baldfield	Alkali Fan (D35)	Favorable	300	Wedgescale saltbush	25
		Normal	225	Galleta	20
		Unfavorable	130	Indian ricegrass	10
				Shadscale	10
				Deserttrumpet	5
				Green molly kochia	5
				Torrey Mormon-tea	5
12 Barx	Semidesert Loam (D35)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Indian ricegrass	15
		Unfavorable	400	Galleta	10
				Bottlebrush squirreltail	10
				Winterfat	10
				Needleandthread	5
				Globemallow	5
				Douglas rabbitbrush	5
13 Bayfield	Upland Clay (D35)	Favorable	800	Mountain big sagebrush	20
		Normal	600	Indian ricegrass	15
		Unfavorable	500	Western wheatgrass	15
				Winterfat	10
				Nevada bluegrass	5
				Bottlebrush squirreltail	5
				Black sagebrush	5
14 Befar	Alkali Flat (D35)	Favorable	1,000	Black greasewood	30
		Normal	750	Bottlebrush squirreltail	20
		Unfavorable	500	Alkali sacaton	10
				Galleta	5
				Seepweed	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Compo-sition
		Kind of year	Dry weight		
			Lb/acre		Pct
15----------------- Behanin	High Mountain Loam (Engelmann Spruce).	Favorable	200	Mountain brome----------------	15
		Normal	100	Bearded wheatgrass------------	10
		Unfavorable	75	Common juniper----------------	10
				Sedge-------------------------	10
				Columbia needlegrass----------	5
				Meadowrue---------------------	5
				Clover------------------------	5
				Oregon-grape------------------	5
16*---------------- Blanchard Family	Mountain Sand (Ponderosa Pine)	Favorable	500	Greenleaf manzanita-----------	20
		Normal	400	Indian ricegrass--------------	10
		Unfavorable	200	Gambel oak--------------------	10
				Nevada bluegrass--------------	5
				Sedge-------------------------	5
17----------------- Borollic Natrargids	Alkali Bottom-----------------	Favorable	2,500	Inland saltgrass--------------	25
		Normal	1,750	Alkali sacaton----------------	20
		Unfavorable	1,000	Alkali bluegrass--------------	15
				Sedge-------------------------	10
				Black greasewood--------------	10
18----------------- Broncho	Semidesert Gravelly Loam (Wyoming Big Sagebrush) South (D28A).	Favorable	800	Bluebunch wheatgrass----------	25
		Normal	600	Wyoming big sagebrush---------	25
		Unfavorable	400	Indian ricegrass--------------	10
				Bottlebrush squirreltail------	5
				Nevada Mormon-tea-------------	5
19, 20------------- Bruman	Semidesert Gravelly Loam (Black Sagebrush).	Favorable	900	Wyoming big sagebrush---------	20
		Normal	700	Black sagebrush---------------	20
		Unfavorable	500	Indian ricegrass--------------	15
				Blue grama--------------------	10
				Needleandthread---------------	10
				Western wheatgrass------------	5
21----------------- Bruman	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush--------	15
		Normal	500	Black sagebrush---------------	15
		Unfavorable	200	Bluegrass---------------------	10
				Indian ricegrass--------------	10
				Antelope bitterbrush----------	10
				Blue grama--------------------	5
				Bottlebrush squirreltail------	5
				Cryptantha--------------------	5
22----------------- Bruman	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush--------	15
		Normal	500	Black sagebrush---------------	15
		Unfavorable	200	Bluegrass---------------------	10
				Indian ricegrass--------------	10
				Antelope bitterbrush----------	10
				Blue grama--------------------	5
				Bottlebrush squirreltail------	5
				Cryptantha--------------------	5
23, 24------------- Bruman	Semidesert Stony Loam---------	Favorable	800	Black sagebrush---------------	30
		Normal	600	Indian ricegrass--------------	15
		Unfavorable	400	Blue grama--------------------	10
				Needleandthread---------------	10
				Wyoming big sagebrush---------	10
				Eriogonum---------------------	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
25 Brycan	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
26 Brycan	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
27 Bushvalley	Mountain Shallow Loam	Favorable	1,200	Bluebunch wheatgrass	10
		Normal	900	Nevada bluegrass	10
		Unfavorable	600	Muttongrass	10
				Slender wheatgrass	10
				Antelope bitterbrush	10
				Mountain snowberry	5
				Mountain big sagebrush	5
				Curlleaf mountainmahogany	5
28*: Callings	High Mountain Loam (Aspen)	Favorable	2,950	Mountain brome	25
		Normal	2,075	Bearded wheatgrass	15
		Unfavorable	1,100	Slender wheatgrass	5
				Aspen peavine	5
				Bluegrass	5
				Nodding brome	5
				Mountain snowberry	5
				Sweetanise	5
Winnemucca	High Mountain Loam	Favorable	2,500	Bearded wheatgrass	20
		Normal	1,800	Mountain brome	15
		Unfavorable	1,200	Slender wheatgrass	5
				Aspen peavine	5
				Currant	5
29, 30 Cannonville	Semidesert Shallow Clay (D35)	Favorable	300	Indian ricegrass	15
		Normal	150	Bottlebrush squirreltail	10
		Unfavorable	50	Corymbed wildbuckwheat	10
				Roundleaf buffaloberry	10
				Eriogonum	10
				Black sagebrush	10
				Shadscale	10
31*: Castino	Mountain Stony Loam	Favorable	1,700	Bluegrass	15
		Normal	1,400	Mountain brome	15
		Unfavorable	800	Gambel oak	15
				Antelope bitterbrush	10
				Muttongrass	10
				Mountain big sagebrush	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
31*:					
Behanin	High Mountain Loam (Engelmann Spruce).	Favorable	200	Mountain brome	15
		Normal	100	Bearded wheatgrass	10
		Unfavorable	75	Common juniper	10
				Sedge	10
				Columbia needlegrass	5
				Meadowrue	5
				Clover	5
				Oregon-grape	5
32*:					
Castino	Mountain Stony Loam	Favorable	1,700	Bluegrass	15
		Normal	1,400	Mountain brome	15
		Unfavorable	800	Gambel oak	15
				Antelope bitterbrush	10
				Muttongrass	10
				Mountain big sagebrush	5
Tica Family	Mountain Shallow Loam	Favorable	1,700	Bluebunch wheatgrass	10
		Normal	900	Nevada bluegrass	10
		Unfavorable	600	Muttongrass	10
				Slender wheatgrass	10
				Antelope bitterbrush	10
				Mountain snowberry	5
				Mountain big sagebrush	5
				Curlleaf mountainmahogany	5
33*:					
Castino	Mountain Stony Loam	Favorable	1,700	Bluegrass	15
		Normal	1,400	Mountain brome	15
		Unfavorable	800	Gambel oak	15
				Antelope bitterbrush	10
				Muttongrass	10
				Mountain big sagebrush	5
Winnemucca	Mountain Loam	Favorable	1,600	Bluebunch wheatgrass	15
		Normal	1,025	Western wheatbrass	10
		Unfavorable	825	Mountain brome	10
				Nevada bluegrass	10
				Letterman needlegrass	5
				Mountain big sagebrush	5
				Aster	5
34*:					
Circleville	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Black sagebrush	15
		Normal	500	Mountain big sagebrush	15
		Unfavorable	200	Bluegrass	10
				Indian ricegrass	10
				Antelope bitterbrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
				Cryptantha	5
Rock outcrop.					
35, 36 Clapper	Upland Stony Loam (Pinyon-Juniper) (D35).	Favorable	1,000	Green Mormon-tea	10
		Normal	700	Rockgoldenrod	10
		Unfavorable	500	Nevada bluegrass	8
				Muttongrass	8
				Blue grama	5
				Prairie junegrass	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
37, 38 Codley	Semidesert Silt Loam	Favorable	800	Western wheatgrass	20
		Normal	600	Winterfat	20
		Unfavorable	400	Indian ricegrass	15
				Basin big sagebrush	15
				Needleandthread	5
				Fourwing saltbush	5
39*:					
Comodore	Upland Shallow Loam (Pinyon-Juniper).	Favorable	600	Mountain big sagebrush	15
		Normal	350	Black sagebrush	15
		Unfavorable	200	Indian ricegrass	15
				Antelope bitterbrush	10
				Blue grama	10
				Bluebunch wheatgrass	10
				Needleandthread	5
Rock outcrop.					
40 Crestline	Semidesert Sandy Loam (Wyoming Big Sagebrush) (D28A).	Favorable	900	Indian ricegrass	25
		Normal	700	Needleandthread	15
		Unfavorable	500	Winterfat	10
				Wyoming big sagebrush	10
				Fourwing saltbush	10
				Douglas rabbitbrush	5
				Western wheatgrass	5
				Bottlebrush squirreltail	5
				Nevada Mormon-tea	5
41 Dalcan	Upland Stony Loam	Favorable	1,300	Mountain big sagebrush	30
		Normal	950	Indian ricegrass	10
		Unfavorable	700	Bluebunch wheatgrass	10
				Antelope bitterbrush	10
				Bluegrass	5
				Blue grama	5
42 Descot	Semidesert Loam (Black Sagebrush).	Favorable	750	Black sagebrush	20
		Normal	500	Indian ricegrass	15
		Unfavorable	300	Blue grama	10
				Needleandthread	10
				Bottlebrush squirreltail	10
				Winterfat	10
43 Descot	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
44 Cimyaw Family	Upland Clay (Pinyon-Juniper)	Favorable	800	Black sagebrush	25
		Normal	600	Mountain big sagebrush	15
		Unfavorable	450	Indian ricegrass	15
				Antelope bitterbrush	10
				Birchleaf mountainmahogany	5
				Blue grama	5
				Western wheatgrass	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
45 Echard	High Mountain Loam (Mixed Conifer).	Favorable	200	Mountain brome	15
		Normal	100	Sedge	10
		Unfavorable	75	Bearded wheatgrass	10
				Mountain snowberry	10
				Common juniper	10
				Oregon-grape	5
				Columbia needlegrass	5
				Meadowrue	5
				Clover	5
46*:					
Ess	High Mountain Loam	Favorable	2,500	Bearded wheatgrass	20
		Normal	1,800	Mountain brome	15
		Unfavorable	1,200	Slender wheatgrass	5
				Aspen peavine	5
				Currant	5
Callings	High Mountain Loam (Aspen)	Favorable	2,950	Mountain brome	20
		Normal	2,075	Bearded wheatgrass	15
		Unfavorable	1,100	Bluegrass	5
				Slender wheatgrass	5
				Nodding brome	5
				Aspen peavine	5
				Sweetanise	5
				Mountain snowberry	5
47, 48 Evanston	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
49 Frandsen	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
50*:					
Frandsen	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
Neto	Loamy Bottom	Favorable	2,000	Basin wildrye	40
		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
51*:					
Frandsen	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
51*:					
Wiggler	Upland Shallow Clay (Pinyon-Juniper).	Favorable	600	Birchleaf mountainmahogany	20
		Normal	450	Indian ricegrass	10
		Unfavorable	250	Fremont mahonia	10
				Utah serviceberry	10
				Nevada bluegrass	5
				Western wheatgrass	5
				Green Mormon-tea	5
52	Upland Loam	Favorable	1,200	Indian ricegrass	25
Fughes		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
53*:					
Gerst Family	Semidesert Shallow Clay (D35)	Favorable	300	Indian ricegrass	15
		Normal	150	Bottlebrush squirreltail	10
		Unfavorable	50	Eriogonum	10
				Corymbed wildbuckwheat	10
				Black sagebrush	10
				Roundleaf buffaloberry	10
				Shadscale	10
Rock outcrop.					
54, 55	Semidesert Silt Loam	Favorable	800	Western wheatgrass	20
Greenhalgh		Normal	600	Winterfat	20
		Unfavorable	400	Indian ricegrass	15
				Basin big sagebrush	15
				Needleandthread	5
				Fourwing saltbush	5
56	Semidesert Gravelly Loam (Wyoming Big Sagebrush) South.	Favorable	800	Bluebunch wheatgrass	25
Grimm		Normal	600	Wyoming big sagebrush	25
		Unfavorable	400	Needleandthread	10
				Indian ricegrass	10
				Bottlebrush squirreltail	5
				Nevada Mormon-tea	5
57	Upland Stony Loam (Black Sagebrush).	Favorable	1,100	Black sagebrush	30
Guben		Normal	850	Indian ricegrass	10
		Unfavorable	500	Antelope bitterbrush	10
				Blue grama	5
				Needleandthread	5
				Mountain big sagebrush	5
58*:					
Guben	Upland Stony Loam	Favorable	1,300	Mountain big sagebrush	30
		Normal	950	Indian ricegrass	10
		Unfavorable	700	Bluebunch wheatgrass	10
				Antelope bitterbrush	10
				Bluegrass	5
				Blue grama	5
Showalter	Upland Stony Loam	Favorable	1,300	Mountain big sagebrush	30
		Normal	950	Indian ricegrass	10
		Unfavorable	700	Bluebunch wheatgrass	10
				Antelope bitterbrush	10
				Bluegrass	5
				Blue grama	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
59, 60 Harol	Upland Stony Loam	Favorable	1,300	Mountain big sagebrush	30
		Normal	950	Indian ricegrass	10
		Unfavorable	700	Bluebunch wheatgrass	10
				Antelope bitterbrush	10
				Bluegrass	5
				Blue grama	5
61 Harol	Mountain Stony Loam	Favorable	1,700	Bluegrass	15
		Normal	1,400	Mountain brome	15
		Unfavorable	800	Gambel oak	15
				Antelope bitterbrush	10
				Muttongrass	10
				Mountain big sagebrush	5
62*:					
Hatch	High Mountain Loam (Mixed Conifer).	Favorable	200	Mountain brome	15
		Normal	100	Bearded wheatgrass	10
		Unfavorable	75	Mountain snowberry	10
				Sedge	10
				Columbia needlegrass	5
				Clover	5
				Oregon-grape	5
				Meadowrue	5
Pahreah	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
63*:					
Hatch	High Mountain Loam (Mixed Conifer).	Favorable	200	Mountain brome	15
		Normal	100	Bearded wheatgrass	10
		Unfavorable	75	Mountain snowberry	10
				Sedge	10
				Columbia needlegrass	5
				Clover	5
				Oregon-grape	5
				Meadowrue	5
Swapps	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
64, 65, 66 Henrieville	Semidesert Sandy Loam (D35)	Favorable	700	Indian ricegrass	20
		Normal	500	Needleandthread	15
		Unfavorable	300	Sand dropseed	10
				Galleta	10
				Wyoming big sagebrush	10
				Mormon-tea	10
				Winterfat	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Comp siti
		Kind of year	Dry weight		
			Lb/acre		Pct
67 Henrieville	Upland Loam (D35)	Favorable	1,300	Wyoming big sagebrush	20
		Normal	1,000	Indian ricegrass	15
		Unfavorable	800	Needleandthread	15
				Bottlebrush squirreltail	5
				Sand dropseed	5
				Galleta	5
				Muttongrass	5
				Blue grama	5
				Fourwing saltbush	5
				Winterfat	5
68*:					
Hernandez Family	Upland Loam (D35)	Favorable	1,300	Wyoming big sagebrush	20
		Normal	1,000	Indian ricegrass	15
		Unfavorable	800	Needleandthread	15
				Muttongrass	5
				Blue grama	5
				Galleta	5
				Sand dropseed	5
				Bottlebrush squirreltail	5
				Fourwing saltbush	5
				Winterfat	5
Clapper	Upland Stony Loam (Pinyon-Utah Juniper) (D35).	Favorable	1,000	Green Mormon-tea	10
		Normal	700	Rockgoldenrod	10
		Unfavorable	500	Nevada bluegrass	8
				Muttongrass	8
				Blue grama	5
				Prairie junegrass	5
69, 70 Ipson	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush	15
		Normal	500	Black sagebrush	15
		Unfavorable	200	Bluegrass	10
				Indian ricegrass	10
				Antelope bitterbrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
				Cryptantha	5
71 Ipson	Semidesert Stony Loam	Favorable	800	Black sagebrush	30
		Normal	600	Indian ricegrass	15
		Unfavorable	400	Blue grama	10
				Needleandthread	10
				Wyoming big sagebrush	10
				Eriogonum	5
72 Jodero	Semidesert Loam (Basin Big Sagebrush).	Favorable	1,100	Indian ricegrass	15
		Normal	900	Basin big sagebrush	15
		Unfavorable	800	Needleandthread	10
				Blue grama	10
				Western wheatgrass	10
				Wyoming big sagebrush	10
				Winterfat	5
73 Jodero	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
74 Kade	Semiwet Fresh Meadow	Favorable	2,500	Kentucky bluegrass	35
		Normal	2,000	Sedge	15
		Unfavorable	1,000	Baltic rush	5
				Basin wildrye	5
				Field horsetail	5
				Western wheatgrass	5
				Silver cinquefoil	5
				Redtop	5
76*:					
Lazear	Upland Shallow Loam (Pinyon-Utah Juniper) (D35).	Favorable	600	Bigelow sagebrush	20
		Normal	400	Mormon-tea	15
		Unfavorable	100	Galleta	5
				Indian ricegrass	5
				Bluegrass	5
				Fine Douglas rabbitbrush	5
				Mexican cliffrose	5
				Roundleaf buffaloberry	5
				Pricklypear	5
Rock outcrop.					
Badland.					
77 Losee	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
78 Losee	Mountain Stony Loam	Favorable	1,700	Bluegrass	15
		Normal	1,400	Mountain brome	15
		Unfavorable	800	Gambel oak	15
				Antelope bitterbrush	10
				Muttongrass	10
				Mountain big sagebrush	5
79 Losee	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
80, 81, 82 Luhon	Semidesert Loam (Black Sagebrush).	Favorable	750	Black sagebrush	20
		Normal	500	Indian ricegrass	15
		Unfavorable	300	Blue grama	10
				Needleandthread	10
				Bottlebrush squirreltail	10
				Winterfat	10
83 Luhon	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
84	Semidesert Loam (Black Sagebrush).	Favorable	750	Black sagebrush	20
Luhon		Normal	500	Indian ricegrass	15
		Unfavorable	300	Blue grama	10
				Needleandthread	10
				Bottlebrush squirreltail	10
				Winterfat	10
85, 86, 87	Semidesert Sand (D35)	Favorable	800	Indian ricegrass	20
Mespun		Normal	600	Needleandthread	10
		Unfavorable	300	Fourwing saltbush	10
				Sand dropseed	5
				Sandhill muhly	5
				Galleta	5
				Munro globemallow	5
				Mormon-tea	5
				Sand sagebrush	5
				Finebranched eriogonum	5
88	Upland Loam (D35)	Favorable	1,300	Wyoming big sagebrush	20
Mikim		Normal	1,000	Indian ricegrass	15
		Unfavorable	800	Needleandthread	15
				Muttongrass	5
				Blue grama	5
				Galleta	5
				Sand dropseed	5
				Bottlebrush squirreltail	5
				Fourwing saltbush	5
				Winterfat	5
89	Semidesert Loam (D35)	Favorable	800	Wyoming big sagebrush	20
Mikim		Normal	600	Indian ricegrass	15
		Unfavorable	400	Bottlebrush squirreltail	10
				Galleta	10
				Winterfat	10
				Needleandthread	5
				Globemallow	5
				Douglas rabbitbrush	5
90	Upland Loam (D35)	Favorable	1,300	Wyoming big sagebrush	20
Mikim		Normal	1,000	Indian ricegrass	15
		Unfavorable	800	Needleandthread	15
				Muttongrass	5
				Blue grama	5
				Galleta	5
				Sand dropseed	5
				Bottlebrush squirreltail	5
				Fourwing saltbush	5
				Winterfat	5
91, 92	Semidesert Loam (D35)	Favorable	800	Wyoming big sagebrush	20
Mikim		Normal	600	Indian ricegrass	15
		Unfavorable	400	Bottlebrush squirreltail	10
				Galleta	10
				Winterfat	10
				Needleandthread	5
				Globemallow	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
93	Loamy Bottom	Favorable	2,000	Basin wildrye	40
Mitch		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
94*:					
Mitch	Loamy Bottom	Favorable	2,000	Basin wildrye	40
		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
Riverwash.					
95	Semidesert Sandy Loam (D35)	Favorable	700	Indian ricegrass	20
Mivida		Normal	500	Needleandthread	15
		Unfavorable	300	Galleta	10
				Fourwing saltbush	10
				Sand dropseed	10
				Mormon-tea	10
				Winterfat	5
96	Loamy Bottom	Favorable	2,000	Basin wildrye	40
Neto		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
97	Semiwet Fresh Meadow	Favorable	2,500	Kentucky bluegrass	35
Neto		Normal	2,000	Sedge	15
		Unfavorable	1,000	Basin wildrye	5
				Baltic rush	5
				Western wheatgrass	5
				Silver cinquefoil	5
				Field horsetail	5
				Redtop	5
98	Semidesert Gravelly Loam (Black Sagebrush).	Favorable	900	Wyoming big sagebrush	20
Notter		Normal	700	Black sagebrush	20
		Unfavorable	500	Indian ricegrass	15
				Needleandthread	10
				Blue grama	10
				Western wheatgrass	5
99	Upland Gravelly Loam (Black Sagebrush).	Favorable	1,500	Black sagebrush	20
Notter		Normal	1,300	Indian ricegrass	15
		Unfavorable	900	Needleandthread	10
				Blue grama	10
				Antelope bitterbrush	10
				Nevada bluegrass	5
				Eriogonum	5
				Mountain big sagebrush	5
100	Semidesert Loam (Basin Big Sagebrush).	Favorable	1,100	Indian ricegrass	15
Notter		Normal	900	Basin big sagebrush	15
		Unfavorable	800	Blue grama	10
				Needleandthread	10
				Western wheatgrass	10
				Wyoming big sagebrush	10
				Winterfat	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
101, 102 Notter	Semidesert Gravelly Loam (Black Sagebrush).	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Black sagebrush	20
		Unfavorable	500	Indian ricegrass	15
				Needleandthread	10
				Blue grama	10
				Western wheatgrass	5
103 Notter	Semidesert Gravelly Loam (Black Sagebrush).	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Black sagebrush	20
		Unfavorable	500	Indian ricegrass	15
				Needleandthread	10
				Blue grama	10
				Western wheatgrass	5
104 Notter Variant	Semidesert Gravelly Loam (Black Sagebrush).	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Black sagebrush	20
		Unfavorable	500	Indian ricegrass	15
				Blue grama	10
				Needleandthread	10
				Western wheatgrass	5
105*:					
Pahreah	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
Sheege	High Mountain Shallow Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
106*:					
Pahreah	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
Sielo	High Mountain Loam (Mixed Conifer).	Favorable	200	Mountain brome	15
		Normal	100	Bearded wheatgrass	10
		Unfavorable	75	Mountain snowberry	10
				Sedge	10
				Columbia needlegrass	5
				Clover	5
				Oregon-grape	5
				Meadowrue	5
107*:					
Pahreah	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
107*:					
Swapps	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
108*:					
Panguitch	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
Mitch	Loamy Bottom	Favorable	2,000	Basin wildrye	40
		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
109*:					
Panguitch	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
Riverwash.					
110 Paunsaugunt	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
111*:					
Paunsaugunt	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
Syrett	Mountain Gravelly Loam (Ponderosa Pine).	Favorable	800	Indian ricegrass	15
		Normal	600	Black sagebrush	15
		Unfavorable	300	Greenleaf manzanita	15
				Antelope bitterbrush	10
				Blue grama	5
				Muttongrass	5
				Mountain big sagebrush	5
				Common juniper	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
113 Plite	Loamy Bottom	Favorable	2,000	Basin wildrye	40
		Normal	1,500	Basin big sagebrush	15
		Unfavorable	1,000	Western wheatgrass	10
				Nevada bluegrass	5
				Rubber rabbitbrush	5
114 Podo	Upland Shallow Loam	Favorable	800	Indian ricegrass	15
		Normal	700	Mountain big sagebrush	15
		Unfavorable	500	Black sagebrush	15
				Nevada bluegrass	10
				Antelope bitterbrush	10
				Bluebunch wheatgrass	5
				Mexican cliffrose	5
115*:					
Podo	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
Wiggler	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Nevada bluegrass	5
				Sedge	5
				Muttongrass	5
				Showy elkweed	5
				Indian ricegrass	5
116*:					
Podo	Upland Shallow Loam (Pinyon-Juniper).	Favorable	600	Indian ricegrass	15
		Normal	350	Mountain big sagebrush	15
		Unfavorable	200	Black sagebrush	15
				Indian ricegrass	15
				Blue grama	10
				Bluebunch wheatgrass	10
				Antelope bitterbrush	10
				Needleandthread	5
Rock outcrop.					
117, 118 Quilt	Upland Clay	Favorable	1,050	Black sagebrush	30
		Normal	750	Indian ricegrass	15
		Unfavorable	500	Western wheatgrass	15
				Mountain big sagebrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
119 Redcreek	Semidesert Shallow Loam	Favorable	800	Black sagebrush	30
		Normal	500	Indian ricegrass	15
		Unfavorable	350	Blue grama	10
				Needleandthread	10
				Eriogonum	5
				Mormon-tea	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
120---------------- Redcreek	Upland Shallow Loam (Pinyon-Juniper).	Favorable	600	Indian ricegrass--------------	15
		Normal	350	Mountain big sagebrush--------	15
		Unfavorable	200	Black sagebrush---------------	15
				Blue grama--------------------	10
				Bluebunch wheatgrass----------	10
				Antelope bitterbrush----------	10
				Needleandthread---------------	5
123*: Rock outcrop.					
Podo--------------	Upland Shallow Loam (Pinyon-Juniper).	Favorable	600	Indian ricegrass--------------	15
		Normal	350	Mountain big sagebrush--------	15
		Unfavorable	200	Black sagebrush---------------	15
				Blue grama--------------------	10
				Bluebunch wheatgrass----------	10
				Antelope bitterbrush----------	10
				Needleandthread---------------	5
125---------------- Ruko	Upland Shallow Clay (Pinyon-Juniper).	Favorable	600	Birchleaf mountainmahogany----	20
		Normal	450	Indian ricegrass--------------	10
		Unfavorable	250	Fremont mahonia---------------	10
				Utah serviceberry-------------	10
				Nevada bluegrass--------------	5
				Western wheatgrass------------	5
				Green Mormon-tea--------------	5
126*: Ruko--------------	Upland Shallow Clay (Pinyon-Juniper).	Favorable	600	Birchleaf mountainmahogany----	20
		Normal	450	Indian ricegrass--------------	10
		Unfavorable	250	Fremont mahonia---------------	10
				Utah serviceberry-------------	10
				Nevada bluegrass--------------	5
				Western wheatgrass------------	5
				Green Mormon-tea--------------	5
Podo--------------	Upland Shallow Loam (Pinyon-Juniper).	Favorable	600	Indian ricegrass--------------	15
		Normal	350	Mountain big sagebrush--------	15
		Unfavorable	200	Black sagebrush---------------	15
				Blue grama--------------------	10
				Bluebunch wheatgrass----------	10
				Antelope bitterbrush----------	10
				Needleandthread---------------	5
127, 128----------- Schauson	Upland Loam-------------------	Favorable	1,200	Indian ricegrass--------------	25
		Normal	950	Mountain big sagebrush--------	20
		Unfavorable	750	Blue grama--------------------	15
				Bottlebrush squirreltail------	5
				Winterfat---------------------	5
129*: Sevier------------	Mountain Loam-----------------	Favorable	1,600	Bluebunch wheatgrass----------	15
		Normal	1,025	Western wheatgrass------------	10
		Unfavorable	825	Mountain brome----------------	10
				Nevada bluegrass--------------	10
				Letterman needlegrass---------	5
				Mountain big sagebrush--------	5
				Aster-------------------------	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
129*:					
Skutum	High Mountain Loam (Aspen)	Favorable	2,950	Mountain brome	25
		Normal	2,075	Bearded wheatgrass	15
		Unfavorable	1,100	Slender wheatgrass	5
				Aspen peavine	5
				Sweetanise	5
				Mountain snowberry	5
				Bluegrass	5
				Nodding brome	5
130*:					
Sheege	High Mountain Shallow Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
Swapps	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
131*:					
Showalter	Upland Stony Loam (Black Sagebrush).	Favorable	1,100	Black sagebrush	30
		Normal	850	Indian ricegrass	10
		Unfavorable	500	Antelope bitterbrush	10
				Blue grama	5
				Mountain big sagebrush	5
				Needleandthread	5
Guben	Upland Stony Loam (Black Sagebrush).	Favorable	1,100	Black sagebrush	30
		Normal	850	Indian ricegrass	10
		Unfavorable	500	Antelope bitterbrush	10
				Blue grama	5
				Needleandthread	5
				Mountain big sagebrush	5
133 Sielo	High Mountain Loam (Mixed Conifer).	Favorable	200	Mountain brome	15
		Normal	100	Bearded wheatgrass	10
		Unfavorable	75	Mountain snowberry	10
				Sedge	10
				Columbia needlegrass	5
				Clover	5
				Meadowrue	5
				Oregon-grape	5
134, 135 Skutum	High Mountain Loam (Aspen)	Favorable	2,950	Mountain brome	25
		Normal	2,075	Bearded wheatgrass	15
		Unfavorable	1,100	Slender wheatgrass	5
				Aspen peavine	5
				Mountain snowberry	5
				Bluegrass	5
				Nodding brome	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
136, 137 Swapps	High Mountain Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
138 Syrett	Mountain Gravelly Loam (Ponderosa Pine).	Favorable	800	Indian ricegrass	15
		Normal	600	Black sagebrush	15
		Unfavorable	300	Greenleaf manzanita	15
				Antelope bitterbrush	10
				Blue grama	5
				Muttongrass	5
				Mountain big sagebrush	5
				Common juniper	5
139*:					
Syrett	Mountain Gravelly Loam (Ponderosa Pine).	Favorable	800	Indian ricegrass	15
		Normal	600	Black sagebrush	15
		Unfavorable	300	Greenleaf manzanita	15
				Antelope bitterbrush	10
				Blue grama	5
				Muttongrass	5
				Mountain big sagebrush	5
				Common juniper	5
Frandsen	Upland Loam	Favorable	1,200	Indian ricegrass	25
		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
140*:					
Syrett	Mountain Gravelly Loam (Ponderosa Pine).	Favorable	800	Indian ricegrass	15
		Normal	600	Black sagebrush	15
		Unfavorable	300	Greenleaf manzanita	15
				Antelope bitterbrush	10
				Blue grama	5
				Muttongrass	5
				Mountain big sagebrush	5
				Common juniper	5
Vanet	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
141, 142 Tebbs	Semidesert Loam (Wyoming Big Sagebrush).	Favorable	850	Wyoming big sagebrush	20
		Normal	600	Indian ricegrass	15
		Unfavorable	350	Needleandthread	10
				Blue grama	10
				Bottlebrush squirreltail	10
				Winterfat	5
				Black sagebrush	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
143	Upland Loam	Favorable	1,200	Indian ricegrass	25
Tebbs		Normal	950	Mountain big sagebrush	20
		Unfavorable	750	Blue grama	15
				Bottlebrush squirreltail	5
				Winterfat	5
144	Upland Shallow Loam	Favorable	800	Indian ricegrass	15
Tolman		Normal	700	Mountain big sagebrush	15
		Unfavorable	500	Black sagebrush	15
				Nevada bluegrass	10
				Antelope bitterbrush	10
				Mexican cliffrose	5
				Bluebunch wheatgrass	5
145*:					
Tolman	Upland Shallow Loam (Pinyon-Juniper).	Favorable	600	Indian ricegrass	15
		Normal	350	Mountain big sagebrush	15
		Unfavorable	200	Black sagebrush	15
				Blue grama	10
				Bluebunch wheatgrass	10
				Antelope bitterbrush	10
				Needleandthread	5
Rock outcrop.					
146	Semidesert Stony Loam	Favorable	800	Black sagebrush	30
Tridell		Normal	600	Indian ricegrass	15
		Unfavorable	400	Blue grama	10
				Needleandthread	10
				Wyoming big sagebrush	10
				Eriogonum	5
147	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush	15
Tridell		Normal	500	Black sagebrush	15
		Unfavorable	200	Indian ricegrass	10
				Bluegrass	10
				Antelope bitterbrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
				Cryptantha	5
148	Semidesert Stony Loam	Favorable	800	Black sagebrush	30
Tridell		Normal	600	Indian ricegrass	15
		Unfavorable	400	Blue grama	10
				Needleandthread	10
				Wyoming big sagebrush	10
				Eriogonum	5
149*:					
Tridell	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Black sagebrush	15
		Normal	500	Mountain big sagebrush	15
		Unfavorable	200	Indian ricegrass	10
				Bluegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Blue grama	5
				Cryptantha	5
Rock outcrop.					

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
150 Ustic Torrifluvents	Upland Stony Loam (Pinyon-Juniper) (D35).	Favorable	1,000	Green Mormon-tea	10
		Normal	700	Rockgoldenrod	10
		Unfavorable	500	Nevada bluegrass	8
				Muttongrass	8
				Blue grama	5
				Prairie junegrass	5
151 Venture	Upland Shallow Hardpan (Pinyon-Juniper).	Favorable	800	Black sagebrush	20
		Normal	700	Nevada bluegrass	20
		Unfavorable	400	Big sagebrush	10
				Douglas rabbitbrush	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Needleandthread	5
152 Venture	Upland Shallow Hardpan	Favorable	950	Black sagebrush	25
		Normal	800	Bluegrass	15
		Unfavorable	600	Antelope bitterbrush	10
				Douglas rabbitbrush	10
				Big sagebrush	5
				Prairie junegrass	5
153 Venture	Semidesert Shallow Loam	Favorable	800	Black sagebrush	30
		Normal	500	Indian ricegrass	15
		Unfavorable	350	Blue grama	10
				Needleandthread	10
				Mormon-tea	5
				Douglas rabbitbrush	5
				Eriogonum	5
154 Villy Family	Wet Fresh Meadow	Favorable	6,500	Sedge	30
		Normal	5,000	Redtop	10
		Unfavorable	3,500	Kentucky bluegrass	10
				Baltic rush	10
				Rush	5
				Western wheatgrass	5
155, 156 Waltershow	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush	15
		Normal	500	Black sagebrush	15
		Unfavorable	200	Indian ricegrass	10
				Bluegrass	10
				Antelope bitterbrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
				Cryptantha	5
157*: Waltershow	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush	15
		Normal	500	Black sagebrush	15
		Unfavorable	200	Indian ricegrass	10
				Bluegrass	10
				Antelope bitterbrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
				Cryptantha	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
157*:					
Venture	Upland Shallow Hardpan (Pinyon-Juniper).	Favorable	800	Black sagebrush	20
		Normal	700	Nevada bluegrass	20
		Unfavorable	400	Big sagebrush	10
				Douglas rabbitbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Antelope bitterbrush	5
				Needleandthread	5
Rock outcrop.					
158 Whiteman	High Mountain Shallow Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
159*:					
Whiteman	High Mountain Shallow Stony Loam (Mixed Conifer).	Favorable	150	Sedge	15
		Normal	100	Mountain brome	10
		Unfavorable	75	Nodding bluegrass	10
				Common juniper	10
				Mountain snowberry	10
				Oregon-grape	5
Skutum	High Mountain Loam (Aspen)	Favorable	2,950	Mountain brome	25
		Normal	2,075	Bearded wheatgrass	15
		Unfavorable	1,100	Slender wheatgrass	5
				Aspen peavine	5
				Sweetanise	5
				Mountain snowberry	5
				Bluegrass	5
				Nodding brome	5
160 Widtsoe	Upland Stony Loam (Pinyon-Juniper).	Favorable	900	Mountain big sagebrush	15
		Normal	500	Black sagebrush	15
		Unfavorable	200	Bluegrass	10
				Indian ricegrass	10
				Antelope bitterbrush	10
				Blue grama	5
				Bottlebrush squirreltail	5
				Cryptantha	5
161 Wiggler	Upland Shallow Clay (Pinyon-Juniper).	Favorable	600	Birchleaf mountainmahogany	20
		Normal	450	Indian ricegrass	10
		Unfavorable	250	Fremont mahonia	10
				Utah serviceberry	10
				Nevada bluegrass	5
				Western wheatgrass	5
				Green Mormon-tea	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
162*:					
Wiggler	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
Guben	Mountain Gravelly Loam (Ponderosa Pine).	Favorable	800	Indian ricegrass	15
		Normal	600	Black sagebrush	15
		Unfavorable	300	Greenleaf manzanita	15
				Antelope bitterbrush	10
				Blue grama	5
				Muttongrass	5
				Mountain big sagebrush	5
				Common juniper	5
163*:					
Wiggler	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Nevada bluegrass	5
				Showy elkweed	5
				Indian ricegrass	5
Rock outcrop.					
Podo	Mountain Shallow Loam (Ponderosa Pine).	Favorable	975	Greenleaf manzanita	20
		Normal	725	Gambel oak	18
		Unfavorable	325	Utah serviceberry	10
				Sedge	5
				Muttongrass	5
				Indian ricegrass	5
				Showy elkweed	5
				Nevada bluegrass	5
164 Winetti	Mountain Gravelly Loam (Ponderosa Pine).	Favorable	800	Indian ricegrass	15
		Normal	600	Black sagebrush	15
		Unfavorable	300	Greenleaf manzanita	15
				Antelope bitterbrush	10
				Blue grama	5
				Muttongrass	5
				Mountain big sagebrush	5
				Common juniper	5
165*:					
Winnemucca	Mountain Loam	Favorable	1,600	Bluebunch wheatgrass	15
		Normal	1,025	Western wheatgrass	10
		Unfavorable	825	Nevada bluegrass	10
				Mountain brome	10
				Letterman needlegrass	5
				Mountain big sagebrush	5
				Aster	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
165*:					
Hoodle	Mountain Loam	Favorable	1,600	Bluebunch wheatgrass	15
		Normal	1,025	Western wheatgrass	10
		Unfavorable	825	Nevada bluegrass	10
				Mountain brome	10
				Letterman needlegrass	5
				Mountain big sagebrush	5
				Aster	5
166, 167, 168 Yarts	Semidesert Sandy Loam (D35)	Favorable	700	Indian ricegrass	20
		Normal	500	Needleandthread	15
		Unfavorable	300	Galleta	10
				Fourwing saltbush	10
				Mormon-tea	10
				Sand dropseed	10
				Winterfat	5
169 Yenlo	Upland Loam (D35)	Favorable	1,300	Wyoming big sagebrush	20
		Normal	1,000	Indian ricegrass	15
		Unfavorable	800	Needleandthread	15
				Muttongrass	5
				Blue grama	5
				Galleta	5
				Sand dropseed	5
				Bottlebrush squirreltail	5
				Fourwing saltbush	5
				Winterfat	5
170 Zillion	Upland Stony Loam (Black Sagebrush).	Favorable	1,100	Black sagebrush	30
		Normal	850	Indian ricegrass	10
		Unfavorable	500	Antelope bitterbrush	10
				Needleandthread	5
				Blue grama	5
				Mountain big sagebrush	5
171 Zinzer	Upland Loam (Black Sagebrush)	Favorable	1,200	Indian ricegrass	25
		Normal	900	Black sagebrush	25
		Unfavorable	600	Blue grama	10
				Needleandthread	5
				Antelope bitterbrush	5
				Granite pricklygilia	5
172 Zyme	Upland Shallow Clay (Pinyon-Utah Juniper) (D35).	Favorable	600	Birchleaf mountainmahogany	20
		Normal	450	Indian ricegrass	10
		Unfavorable	250	Fremont mahonia	10
				Utah serviceberry	10
				Nevada bluegrass	5
				Western wheatgrass	5
				Green Mormon-tea	5
173*:					
Zyme	Upland Shallow Clay (Pinyon-Utah Juniper) (D35).	Favorable	600	Birchleaf mountainmahogany	20
		Normal	450	Indian ricegrass	10
		Unfavorable	250	Fremont mahonia	10
				Utah serviceberry	10
				Nevada bluegrass	5
				Western wheatgrass	5
				Green Mormon-tea	5

See footnote at end of table.

TABLE 5.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC VEGETATION--Continued

Soil name and map symbol	Grazing site	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
173*:					
Lazear	Upland Shallow Loam (Pinyon-Utah Juniper) (D35).	Favorable	600	Bigelow sagebrush	20
		Normal	400	Mormon-tea	15
		Unfavorable	100	Galleta	5
				Indian ricegrass	5
				Bluegrass	5
				Fine Douglas rabbitbrush	5
				Mexican cliffrose	5
				Roundleaf buffaloberry	5
				Pricklypear	5
Rock outcrop.					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1*:				
Ahlstrom	Slight	Slight	Moderate: slope.	Slight.
Osote	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
2 Alldown	Slight	Slight	Slight	Slight.
3 Alldown	Slight	Slight	Moderate: slope.	Slight.
4 Alldown	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
5 Alldown	Slight	Slight	Moderate: slope.	Slight.
6 Andys	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
7 Andys	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
8*: Badland.				
Cannonville	Severe: slope, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: slope.	Severe: too clayey, slope.
Rock outcrop.				
9*: Badland.				
Rock outcrop.				
Paunsaugunt	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
10, 11 Baldfield	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
12 Barx	Slight	Slight	Severe: slope.	Severe: erodes easily.
13 Bayfield	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
14 Befar	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
15 Behanin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
16* Blanchard Family	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.
17 Borollic Natrargids	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: dusty.
18 Broncho	Severe: small stones.	Severe: small stones.	Severe: small stones.	Moderate: large stones.
19 Bruman	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.
20 Bruman	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Moderate: dusty.
21 Bruman	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
22 Bruman	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
23 Bruman	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope, dusty.
24 Bruman	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
25 Brycan	Slight	Slight	Moderate: slope.	Severe: erodes easily.
26 Brycan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.
27 Bushvalley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
28*:				
Callings	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
28*:				
Winnemucca	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
29 Cannonville	Severe: slope, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: slope.	Severe: too clayey, slope.
30 Cannonville	Severe: slope, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: large stones, slope, small stones.	Severe: large stones, too clayey, slope.
31*:				
Castino	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope, large stones.
Behanin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32*:				
Castino	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope, large stones.
Tica Family	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
33*:				
Castino	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: slope, small stones.	Slight.
Winnemucca	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
34*:				
Circleville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, small stones.
Rock outcrop.				
35 Clapper	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope, dusty.
36 Clapper	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
37 Codley	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
38 Codley	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.
39*:				
Comodore	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Rock outcrop.				
40 Crestline	Slight	Slight	Moderate: slope.	Slight.
41 Dalcan	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Severe: large stones.
42 Descot	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
43 Descot	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.
44 Dimyaw Family	Severe: excess sodium.	Severe: excess sodium.	Severe: slope, small stones, excess sodium.	Slight.
45 Echard	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
46*:				
Ess	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Callings	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
47 Evanston	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.
48 Evanston	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: large stones, slope.	Slight.
49 Frandsen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
50*:				
Frandsen	Slight	Slight	Moderate: slope, small stones.	Slight.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
50*:				
Neto	Severe: flooding.	Slight	Moderate: slope.	Slight.
51*:				
Frandsen	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Wiggler	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
52 Fughes	Slight	Slight	Moderate: slope.	Severe: erodes easily.
53*:				
Gerst Family	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
Rock outcrop.				
54 Greenhalgh	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
55 Greenhalgh	Severe: flooding.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.
56 Grimm	Slight	Slight	Moderate: slope, small stones.	Slight.
57 Guben	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight.
58*:				
Guben	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight.
Showalter	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
59 Harol	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Severe: large stones.
60 Harol	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
61 Harol	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
62*: Hatch	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Pahreah	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.
63*: Hatch	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Swapps	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
64 Henrieville	Slight	Slight	Slight	Slight.
65 Henrieville	Slight	Slight	Moderate: slope.	Slight.
66 Henrieville	Slight	Slight	Severe: slope.	Slight.
67 Henrieville	Slight	Slight	Moderate: slope.	Slight.
68*: Hernandez Family	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight.
Clapper	Moderate: large stones, dusty.	Moderate: large stones, dusty.	Severe: large stones.	Moderate: large stones, dusty.
69 Ipson	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
70 Ipson	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
71 Ipson	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
72 Jodero	Severe: flooding.	Slight	Slight	Slight.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
73 Jodero	Severe: flooding.	Slight	Moderate: slope.	Slight.
74 Kade	Severe: flooding, wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: wetness. percs slowly	Moderate: wetness.
75*. Lava flows				
76*:				
Lazear	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
Rock outcrop.				
Badland.				
77 Losee	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
78 Losee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
79 Losee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
80 Luhon	Slight	Slight	Moderate: slope, small stones.	Slight.
81 Luhon	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
82 Luhon	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.
83 Luhon	Slight	Slight	Severe: slope.	Slight.
84 Luhon	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: slope, small stones.	Moderate: large stones.
85, 86 Mespun	Slight	Slight	Moderate: slope.	Slight.
87 Mespun	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
88 Mikim	Slight	Slight	Moderate: slope.	Slight.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
89 Mikim	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
90 Mikim	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.
91 Mikim	Slight	Slight	Slight	Severe: erodes easily.
92 Mikim	Slight	Slight	Moderate: slope.	Severe: erodes easily.
93 Mitch	Severe: flooding.	Slight	Slight	Slight.
94*:				
Mitch	Severe: flooding.	Slight	Slight	Slight.
Riverwash.				
95 Mivida	Slight	Slight	Severe: slope.	Slight.
96 Neto	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
97 Neto	Severe: flooding.	Slight	Slight	Severe: erodes easily.
98, 99 Notter	Slight	Slight	Moderate: slope, small stones.	Moderate: dusty.
100 Notter	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Moderate: dusty.
101 Notter	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
102 Notter	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
103 Notter	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, dusty.
104 Notter Variant	Slight	Slight	Moderate: slope.	Slight.
105*:				
Pahreah	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
105*:				
Sheege	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.
106*:				
Pahreah	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.
Sielo	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.
107*:				
Pahreah	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Swapps	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
108*:				
Panguitch	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
Mitch	Severe: flooding.	Slight	Slight	Slight.
109*:				
Panguitch	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Riverwash.				
110 Paunsaugunt	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
111*:				
Paunsaugunt	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
Syrett	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
112*. Playas				
113 Plite	Slight	Slight	Moderate: slope.	Slight.
114 Podo	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
115*:				
Podo	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: slope.
Wiggler	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
116*:				
Podo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
117 Quilt	Moderate: slope.	Moderate: slope.	Severe: large stones, slope.	Moderate: large stones.
118 Quilt	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
119 Redcreek	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
120 Redcreek	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
121*. Riverwash				
122*. Rock outcrop				
123*:				
Rock outcrop.				
Podo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
124*. Rubble land				
125 Ruko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
126*:				
Ruko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
126*:				
Podo	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope. slope.	Severe: slope. slope.
127 Schauson	Slight	Slight	Moderate: slope, small stones.	Slight.
128 Schauson	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
129*:				
Sevier	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Skutum	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
130*:				
Sheege	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Swapps	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
131*:				
Showalter	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Moderate: large stones.
Guben	Slight	Slight	Severe: small stones.	Slight.
132 Shupert	Severe: flooding.	Slight	Slight	Severe: erodes easily.
133 Sielo	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.
134 Skutum	Slight	Slight	Moderate: slope.	Slight.
135 Skutum	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
136 Swapps	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
137 Swapps	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
138 Syrett	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
139*: Syrett	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
139*: Frandsen	Slight	Slight	Moderate: slope, small stones.	Slight.
140*: Syrett	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Vanet	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
141 Tebbs	Slight	Slight	Moderate: slope.	Slight.
142, 143 Tebbs	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
144 Tolman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
145*: Tolman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
146 Tridell	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.
147 Tridell	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones.	Moderate: dusty.
148 Tridell	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: large stones, small stones.	Moderate: large stones.
149*: Tridell	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
149*: Rock outcrop.				
150 Ustic Torrifluvents	Severe: floods.	Slight	Moderate: slope, floods.	Slight.
151 Venture	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: large stones, slope.	Moderate: large stones, slope.
152 Venture	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, slope.	Moderate: large stones.
153 Venture	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: large stones, slope.	Moderate: large stones, slope.
154* Villy Family	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
155 Waltershow	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.
156 Waltershow	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
157*: Waltershow	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Venture	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, slope.	Moderate: large stones.
Rock outcrop.				
158 Whiteman	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, small stones.	Severe: large stones.
159*: Whiteman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Skutum	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
160 Widtsoe	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Slight.
161 Wiggler	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
162*: Wiggler	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Guben	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, small stones.
163*: Wiggler	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
Podo	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: slope.
164 Winetti	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
165*: Winnemucca	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Hoodle	Slight	Slight	Severe: slope, small stones.	Slight.
166 Yarts	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
167 Yarts	Slight	Slight	Moderate: slope.	Slight.
168 Yarts	Slight	Slight	Severe: slope.	Slight.
169 Yenlo	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.
170 Zillion	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.

See footnote at end of table.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
171 Zinzer	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.
172 Zyme	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
173*:				
Zyme	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
Lazear	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
Rock outcrop.				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
1*:				
Ahlstrom	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Osote	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Moderate: low strength, slope, frost action.
2, 3 Alldown	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
4 Alldown	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
5 Alldown	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
6 Andys	Moderate: slope.	Moderate: slope.	Moderate: slope.	Moderate: slope, frost action.
7 Andys	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
8*:				
Badland.				
Cannonville	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.
Rock outcrop.				
9*:				
Badland.				
Rock outcrop.				
Paunsaugunt	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
10, 11 Baldfield	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
12 Barx	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
13 Bayfield	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
14 Befar	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
15 Behanin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
16* Blanchard Family	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
17 Borollic Natrargids	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Moderate: low strength, shrink-swell, frost action.
18 Broncho	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
19, 20 Bruman	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action, large stones.
21, 22, 23, 24 Bruman	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
25 Brycan	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
26 Brycan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Moderate: slope, frost action, shrink-swell.
27 Bushvalley	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.
28*:				
Callings	Moderate: too clayey, large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, large stones.	Moderate: slope, frost action, shrink-swell.
Winnemucca	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: low strength, large stones.
29, 30 Cannonville	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
31*:				
Castino	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: low strength, slope, large stones.
Behanin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32*:				
Castino	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: low strength, slope, large stones.
Tica Family	Severe: depth to rock, large stones, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: depth to rock, low strength, slope.
33*:				
Castino	Severe: depth to rock, large stones.	Severe: large stones.	Severe: depth to rock, large stones.	Severe: low strength, large stones.
Winnemucca	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: low strength, slope, large stones.
34*:				
Circleville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Rock outcrop.				
35, 36 Clapper	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
37, 38 Codley	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
39*:				
Comodore	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
Rock outcrop.				
40 Crestline	Slight	Slight	Slight	Moderate: frost action.
41 Dalcan	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Moderate: depth to rock, slope, frost action.
42, 43 Descot	Slight	Slight	Slight	Moderate: frost action.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
44 Dimyaw Family	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
45 Echard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
46*:				
Ess	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Callings	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
47 Evanston	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
48 Evanston	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Moderate: low strength, slope, frost action.
49 Frandsen	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Moderate: low strength, slope, frost action.
50*:				
Frandsen	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
Neto	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
51*:				
Frandsen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wiggler	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
52 Fughes	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
53*:				
Gerst Family	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Rock outcrop.				

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
54, 55 Greenhalgh	Slight	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
56 Grimm	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.
57 Guben	Moderate: slope.	Moderate: slope.	Moderate: slope.	Moderate: slope, frost action.
58*: Guben	Moderate: slope.	Moderate: slope.	Moderate: slope.	Moderate: slope, frost action.
Showalter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
59 Harol	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Moderate: slope, frost action, large stones.
60 Harol	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
61 Harol	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
62*: Hatch	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Pahreah	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
63*: Hatch	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Swapps	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
64, 65, 66, 67 Henrieville	Severe: cutbanks cave.	Slight	Slight	Slight.
68*: Hernandez Family	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
68*:				
Clapper	Slight	Slight	Slight	Moderate: frost action.
69, 70, 71 Ipson	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
72, 73 Jodero	Slight	Severe: flooding.	Severe: flooding.	Moderate: frost action, shrink-swell, flooding.
74 Kade	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: low strength, shrink-swell.
75*. Lava flows				
76*:				
Lazear	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Rock outcrop.				
Badland.				
77 Losee	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Moderate: slope, frost action, large stones.
78, 79 Losee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
80 Luhon	Slight	Slight	Moderate: shrink-swell.	Moderate: frost action.
81, 82 Luhon	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
83, 84 Luhon	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, frost action.
85, 86 Mespun	Severe: cutbanks cave.	Slight	Slight	Slight.
87 Mespun	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Moderate: slope.
88 Mikim	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
89 Mikim	Slight	Slight	Slight	Moderate: frost action.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
90 Mikim	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
91, 92 Mikim	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action, shrink-swell.
93 Mitch	Slight	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
94*:				
Mitch	Slight	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
Riverwash.				
95 Mivida	Slight	Slight	Slight	Slight.
96 Neto	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
97 Neto	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: frost action.
98, 99 Notter	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
100 Notter	Slight	Moderate: shrink-swell.	Slight	Severe: low strength.
101 Notter	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
102 Notter	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
103 Notter	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Moderate: slope, frost action.
104 Notter Variant	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
105*:				
Pahreah	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Moderate: depth to rock, slope, frost action.
Sheege	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
106*: Pahreah	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Sielo	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
107*: Pahreah	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Swapps	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
108*: Panguitch	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
Mitch	Slight	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
109*: Panguitch	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Moderate: slope, frost action.
Riverwash.				
110 Paunsaugunt	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
111*: Paunsaugunt	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Syrett	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: depth to rock, frost action.
112*. Playas				
113 Plite	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
114 Podo	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
115*: Podo	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
115*:				
Wiggler	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
116*:				
Podo	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
Rock outcrop.				
117 Quilt	Moderate: too clayey, large stones.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: low strength.
118 Quilt	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
119, 120 Redcreek	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
121*. Riverwash				
122*. Rock outcrop				
123*: Rock outcrop.				
Podo	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
124*. Rubble land				
125 Ruko	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: low strength, slope.
126*:				
Ruko	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: low strength, slope.
Podo	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
127 Schauson	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
128 Schauson	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Moderate: low strength, slope, shrink-swell.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
129*:				
Sevier	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Skutum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
130*:				
Sheege	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
Swapps	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
131*:				
Showalter	Moderate: too clayey, large stones.	Moderate: shrink-swell, large stones.	Moderate: large stones.	Moderate: frost action, shrink-swell.
Guben	Slight	Slight	Slight	Moderate: frost action.
132 Shupert	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.
133 Sielo	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
134 Skutum	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
135 Skutum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
136, 137 Swapps	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
138 Syrett	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: depth to rock, frost action.
139*:				
Syrett	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: depth to rock, frost action.
Frandsen	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strengtn, frost action.
140*:				
Syrett	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
140*: Vanet	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
141, 142, 143 Tebbs	Severe: cutbanks cave.	Slight	Slight	Moderate: frost action.
144 Tolman	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Severe: depth to rock.
145*: Tolman	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
Rock outcrop.				
146 Tridell	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action, large stones.
147, 148 Tridell	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Moderate: slope, frost action.
149*: Tridell	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Rock outcrop.				
150 Ustic Torrifluvents	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
151 Venture	Severe: cemented pan, slope.	Severe: slope.	Severe: cemented pan, slope.	Severe: slope.
152 Venture	Severe: cemented pan.	Moderate: shrink-swell, slope, cemented pan.	Severe: cemented pan.	Moderate: cemented pan, slope, frost action.
153 Venture	Severe: cemented pan, slope.	Severe: slope.	Severe: cemented pan, slope.	Severe: slope.
154* Villy Family	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, frost action.
155, 156 Waltershow	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
157*:				
Waltershow	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Venture	Severe: cemented pan.	Moderate: shrink-swell, slope, cemented pan.	Severe: cemented pan.	Moderate: cemented pan, slope, frost action.
Rock outcrop.				
158 Whiteman	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.
159*:				
Whiteman	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.
Skutum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
160 Widtsoe	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.
161 Wiggler	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
162*:				
Wiggler	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Guben	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
163*:				
Wiggler	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Rock outcrop.				
Podo	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
164 Winetti	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
165*:				
Winnemucca	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: low strength, slope, large stones.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Local roads and streets
165*:				
Hoodle	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action, large stones.
166, 167, 168 Yarts	Slight	Slight	Slight	Moderate: frost action.
169 Yenlo	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
170 Zillion	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
171 Zinzer	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Moderate: low strength, slope, frost action.
172 Zyme	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
173*:				
Zyme	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Lazear	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Rock outcrop.				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
1*:				
Ahlstrom	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Poor: too clayey.
Osote	Severe: percs slowly.	Severe: slope.	Moderate: slope, large stones.	Poor: large stones.
2 Alldown	Severe: percs slowly.	Slight	Slight	Good.
3 Alldown	Severe: percs slowly.	Moderate: slope.	Slight	Good.
4 Alldown	Severe: percs slowly.	Moderate: seepage.	Slight	Good.
5 Alldown	Severe: percs slowly.	Moderate: slope.	Slight	Good.
6 Andys	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Poor: small stones.
7 Andys	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
8*:				
Badland.				
Cannonville	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
Rock outcrop.				
9*:				
Badland.				
Rock outcrop.				
Paunsaugunt	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Poor: depth to rock, large stones.
10, 11 Baldfield	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Poor: too clayey.
12 Barx	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Fair: small stones.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
13------------------ Bayfield	Severe: percs slowly.	Moderate: slope.	Slight----------------	Good.
14------------------ Befar	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Poor: too clayey, hard to pack.
15------------------ Behanin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Poor: large stones, slope.
16*----------------- Blanchard Family	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: too sandy, slope.
17------------------ Borollic Natrargids	Severe: wetness, percs slowly.	Moderate: wetness.	Severe: wetness.	Good.
18------------------ Broncho	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Poor: seepage, too sandy, small stones.
19, 20-------------- Bruman	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Poor: seepage, too sandy, small stones.
21, 22-------------- Bruman	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: slope, too sandy, large stones.	Poor: seepage, too sandy, large stones.
23, 24-------------- Bruman	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: slope, too sandy.	Poor: seepage, too sandy, small stones.
25------------------ Brycan	Moderate: percs slowly.	Severe: seepage.	Slight----------------	Good.
26------------------ Brycan	Moderate: percs slowly, slope.	Severe: seepage, slope.	Moderate: slope.	Fair: slope.
27------------------ Bushvalley	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: area reclaim, large stones, slope.
28*:				
Callings-----------	Severe: percs slowly.	Severe: slope.	Severe: large stones.	Poor: large stones.
Winnemucca---------	Severe: percs slowly, large stones.	Severe: slope.	Severe: large stones.	Poor: large stones.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
29, 30 Cannonville	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
31*:				
Castino	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Poor: depth to rock, too clayey, large stones.
Behanin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Poor: large stones, slope.
32*:				
Castino	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Poor: depth to rock, too clayey, large stones.
Tica Family	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Poor: depth to rock, too clayey, large stones.
33*:				
Castino	Severe: depth to rock, percs slowly, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, too clayey, large stones.	Poor: depth to rock, too clayey, large stones.
Winnemucca	Severe: percs slowly, slope, large stones.	Severe: slope.	Severe: slope, large stones.	Poor: large stones, slope.
34*:				
Circleville	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
35, 36 Clapper	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
37 Codley	Severe: percs slowly.	Slight	Slight	Good.
38 Codley	Severe: percs slowly.	Moderate: slope.	Slight	Good.
39*:				
Comodore	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
39*: Rock outcrop.				
40 Crestline	Slight	Severe: seepage.	Slight	Good.
41 Dalcan	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Poor: area reclaim, small stones.
42, 43 Descot	Slight	Severe: seepage.	Slight	Good.
44 Dimyaw Family	Severe: percs slowly.	Severe: slope.	Severe: too clayey, excess sodium.	Poor: too clayey, excess sodium.
45 Echard	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Poor: slope.
46*: Ess	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Poor: large stones, slope.
Callings	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, large stones.	Poor: large stones, slope.
47 Evanston	Severe: percs slowly.	Moderate: slope.	Severe: seepage.	Fair: too clayey.
48 Evanston	Severe: percs slowly.	Severe: slope.	Severe: seepage.	Fair: too clayey, slope.
49 Frandsen	Moderate: percs slowly, slope.	Severe: slope.	Severe: seepage.	Fair: too clayey, slope.
50*: Frandsen	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: seepage.	Fair: too clayey.
Neto	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
51*: Frandsen	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
Wiggler	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
52 Hughes	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Poor: too clayey.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
53*:				
Gerst Family	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop.				
54 Greenhalgh	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Good.
55 Greenhalgh	Moderate: flooding, percs slowly.	Moderate: seepage, slope.	Moderate: flooding.	Good.
56 Grimm	Severe: poor filter.	Severe: seepage.	Severe: too sandy, large stones.	Poor: seepage, too sandy, small stones.
57 Guben	Moderate: percs slowly, slope.	Severe: slope.	Severe: seepage.	Poor: small stones.
58*:				
Guben	Moderate: percs slowly, slope.	Severe: slope.	Severe: seepage.	Poor: small stones.
Showalter	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
59 Harol	Severe: percs slowly, poor filter.	Severe: seepage, slope, large stones.	Severe: too sandy, large stones.	Poor: seepage, too sandy, small stones.
60 Harol	Severe: percs slowly, poor filter, slope.	Severe: seepage, slope, large stones.	Severe: slope, too sandy, large stones.	Poor: seepage, too sandy, small stones.
61 Harol	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Poor: large stones, slope.
62*:				
Hatch	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Poor: depth to rock, too clayey, slope.
Pahreah	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, small stones.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
63*:				
Hatch	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Poor: depth to rock, too clayey, slope.
Swapps	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: small stones, slope, depth to rock.
64, 65 Henrieville	Slight	Severe: seepage.	Slight	Good.
66 Henrieville	Slight	Severe: seepage, slope.	Slight	Good.
67 Henrieville	Slight	Severe: seepage.	Slight	Good.
68*:				
Hernandez Family	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Fair: too clayey.
Clapper	Moderate: percs slowly.	Moderate: seepage, slope, large stones.	Moderate: large stones.	Poor: small stones.
69 Ipson	Severe: slope.	Severe: seepage, slope.	Severe: slope, too sandy.	Poor: seepage, too sandy, small stones.
70, 71 Ipson	Severe: slope.	Severe: seepage, slope, large stones.	Severe: slope, too sandy.	Poor: seepage, too sandy, small stones.
72 Jodero	Severe: percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Fair: too clayey.
73 Jodero	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: flooding, too clayey.	Fair: too clayey.
74 Kade	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: wetness.
75*. Lava flows				
76*:				
Lazear	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: area reclaim.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
76*:				
Rock outcrop.				
Badland.				
77----------------- Losee	Moderate: percs slowly, slope, large stones.	Severe: slope.	Severe: large stones.	Poor: small stones.
78, 79------------- Losee	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Poor: small stones, slope.
80, 81, 82--------- Luhon	Moderate: percs slowly.	Severe: seepage.	Slight---------------	Good.
83, 84------------- Luhon	Moderate: percs slowly, slope.	Severe: seepage, slope.	Moderate: slope.	Fair: slope.
85, 86------------- Mespun	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Poor: too sandy.
87----------------- Mespun	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Poor: too sandy.
88----------------- Mikim	Severe: percs slowly.	Moderate: slope.	Slight---------------	Good.
89----------------- Mikim	Severe: percs slowly.	Slight--------------	Slight---------------	Good.
90----------------- Mikim	Severe: percs slowly.	Moderate: slope.	Slight---------------	Good.
91----------------- Mikim	Severe: percs slowly.	Slight--------------	Slight---------------	Good.
92----------------- Mikim	Severe: percs slowly.	Moderate: slope.	Slight---------------	Good.
93----------------- Mitch	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Good.
94*:				
Mitch--------------	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Good.
Riverwash.				
95----------------- Mivida	Slight--------------	Severe: seepage.	Slight---------------	Good.
96----------------- Neto	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: thin layer.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
97 Neto	Severe: wetness.	Severe: seepage.	Severe: seepage, wetness.	Good.
98, 99 Notter	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Poor: too sandy, small stones.
100 Notter	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Poor: small stones.
101 Notter	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Poor: too sandy, small stones.
102 Notter	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Poor: too sandy, small stones, slope.
103 Notter	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Poor: seepage, too sandy, small stones.
104 Notter Variant	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Poor: seepage, too sandy, small stones.
105*: Pahreah	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Poor: depth to rock, seepage, small stones.
Sheege	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: depth to rock, small stones.
106*: Pahreah	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, small stones.
Sielo	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Fair: too clayey.
107*: Pahreah	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, small stones.
Swapps	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: small stones, slope, depth to rock.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
108*:				
Panguitch	Slight	Severe: seepage.	Severe: seepage.	Poor: small stones.
Mitch	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Good.
109*:				
Panguitch	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Poor: small stones.
Riverwash.				
110 Paunsaugunt	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Poor: depth to rock, large stones.
111*:				
Paunsaugunt	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Poor: depth to rock, large stones.
Syrett	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: depth to rock, small stones.
112*. Playas				
113 Plite	Slight	Severe: seepage.	Severe: seepage.	Fair: too sandy.
114 Podo	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
115*:				
Podo	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, large stones, slope.
Wiggler	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
116*:				
Podo	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
117 Quilt	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage, too clayey.	Poor: too clayey, small stones.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
118----------------- Quilt	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Poor: too clayey, small stones, slope.
119, 120------------ Redcreek	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
121*. Riverwash				
122*. Rock outcrop				
123*: Rock outcrop.				
Podo----------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, large stones, slope.
124*. Rubble land				
125----------------- Ruko	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Poor: area reclaim, too clayey, slope.
126*:				
Ruko----------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Poor: area reclaim, too clayey, slope.
Podo----------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
127----------------- Schauson	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Fair: too clayey.
128----------------- Schauson	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Fair: too clayey, slope.
129*:				
Sevier-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Poor: depth to rock, too clayey, hard to pack.
Skutum-------------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Poor: too clayey, small stones, slope.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
130*:				
Sheege	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Swapps	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: small stones, slope, depth to rock.
131*:				
Showalter	Severe: percs slowly.	Moderate: seepage, large stones.	Moderate: large stones.	Poor: small stones.
Guben	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: seepage.	Poor: small stones.
132 Shupert	Severe: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Fair: too clayey.
133 Sielo	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Fair: too clayey.
134 Skutum	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Poor: too clayey, small stones.
135 Skutum	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Poor: too clayey, small stones, slope.
136, 137 Swapps	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: small stones, slope, depth to rock.
138 Syrett	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: depth to rock, small stones.
139*:				
Syrett	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: depth to rock, small stones.
Frandsen	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: seepage.	Fair: too clayey.
140*:				
Syrett	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
140*:				
Vanet	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
141 Tebbs	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too sandy.	Fair: too sandy.
142, 143 Tebbs	Moderate: percs slowly.	Moderate: seepage.	Moderate: too sandy.	Fair: too sandy.
144 Tolman	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
145*:				
Tolman	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
146 Tridell	Severe: poor filter.	Severe: seepage, large stones.	Severe: large stones.	Fair: small stones.
147, 148 Tridell	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: large stones.	Fair: small stones, slope.
149*:				
Tridell	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Poor: large stones, slope.
Rock outcrop.				
150 Ustic Torrifluvents	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Poor: seepage, small stones.
151 Venture	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: slope, large stones.	Poor: cemented pan, small stones, slope.
152 Venture	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: large stones.	Poor: cemented pan, small stones.
153 Venture	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: slope, large stones.	Poor: cemented pan, small stones, slope.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
154* Villy Family	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: wetness.
155, 156 Waltershow	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, too sandy.	Poor: seepage, too sandy, small stones.
157*:				
Waltershow	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, too sandy.	Poor: seepage, too sandy, small stones.
Venture	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: large stones.	Poor: cemented pan, small stones.
Rock outcrop.				
158 Whiteman	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Poor: depth to rock, large stones.
159*:				
Whiteman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Skutum	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Poor: too clayey, small stones, slope.
160 Widtsoe	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Poor: small stones, slope.
161 Wiggler	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
162*:				
Wiggler	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Guben	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Poor: small stones, slope.
163*:				
Wiggler	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
163*:				
Podo	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, large stones, slope.
164 Winetti	Moderate: flooding.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
165*:				
Winnemucca	Severe: percs slowly, slope, large stones.	Severe: slope.	Severe: slope, large stones.	Poor: large stones, slope.
Hoodle	Moderate: large stones.	Severe: seepage, slope.	Severe: seepage, large stones.	Poor: large stones.
166, 167 Yarts	Slight	Severe: seepage.	Slight	Good.
168 Yarts	Slight	Severe: seepage, slope.	Slight	Good.
169 Yenlo	Severe: percs slowly.	Moderate: slope.	Slight	Good.
170 Zillion	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
171 Zinzer	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Fair: too clayey, slope.
172 Zyme	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
173*:				
Zyme	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Lazear	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: area reclaim.
Rock outcrop.				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. Se
"good," "fair," and other terms. Absence of an entry indicates that the soil
information in this table indicates the dominant soil condition but does not el
onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel
1*:			
Ahlstrom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.
Osote	Good	Improbable: excess fines.	Improbable: excess fines.
2, 3 Alldown	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.
4 Alldown	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.
5 Alldown	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.
6 Andys	Good	Improbable: excess fines.	Improbable: excess fines.
7 Andys	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.
8*: Badland.			
Cannonville	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.
Rock outcrop.			
9*: Badland.			
Rock outcrop.			
Paunsaugunt	Poor: depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.
10, 11 Baldfield	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.
12 Barx	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.
13 Bayfield	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.

See footnote at end of table.

ee text for definitions of
as not rated. The
iminate the need for

Topsoil
Poor: too clayey.
Poor: area reclaim.
Fair: too clayey.
Poor: thin layer.
Fair: too clayey.
Poor: area reclaim.
Poor: small stones, slope.
Poor: depth to rock, too clayey, slope.
Poor: depth to rock, large stones.
Poor: too clayey.
Poor: small stones.
Poor: too clayey.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
14------------------- Befar	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
15------------------- Behanin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
16*------------------ Blanchard Family	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, slope.
17------------------- Borollic Natrargids	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
18------------------- Broncho	Good-----------------	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
19, 20--------------- Bruman	Fair: large stones.	Probable-------------	Probable-------------	Poor: small stones, area reclaim.
21------------------- Bruman	Fair: large stones, slope.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
22------------------- Bruman	Poor: slope.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
23------------------- Bruman	Fair: large stones, slope.	Probable-------------	Probable-------------	Poor: small stones, area reclaim, slope.
24------------------- Bruman	Poor: slope.	Probable-------------	Probable-------------	Poor: small stones, area reclaim, slope.
25------------------- Brycan	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
26------------------- Brycan	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
27------------------- Bushvalley	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
28*: Callings--------------	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
28*:				
Winnemucca	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
29, 30 Cannonville	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, slope.
31*:				
Castino	Poor: low strength, large stones, depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope, too clayey.
Behanin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
32*:				
Castino	Poor: low strength, large stones, depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope, too clayey.
Tica Family	Poor: depth to rock, low strength, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones, slope.
33*:				
Castino	Poor: depth to rock, low strength, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, too clayey.
Winnemucca	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
34*:				
Circleville	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
Rock outcrop.				
35 Clapper	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
36 Clapper	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
37, 38 Codley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
39*: Comodore	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
40 Crestline	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
41 Dalcan	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
42, 43 Descot	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
44 Dimyaw Family	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
45 Echard	Fair: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
46*: Ess	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
Callings	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
47 Evanston	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
48 Evanston	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
49 Frandsen	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
50*: Frandsen	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Neto	Good	Improbable: small stones.	Probable	Poor: area reclaim.
51*: Frandsen	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
51*:				
Wiggler	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
52 Fughes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
53*:				
Gerst Family	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
Rock outcrop.				
54, 55 Greenhalgh	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
56 Grimm	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
57 Guben	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
58*:				
Guben	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Showalter	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
59 Harol	Fair: large stones.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
60 Harol	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
61 Harol	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
62*:				
Hatch	Poor: depth to rock, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pahreah	Poor: depth to rock.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, slope.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
63*:				
Hatch	Poor: depth to rock, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Swapps	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
64, 65, 66, 67 Henrieville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
68*:				
Hernandez Family	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Clapper	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
69 Ipson	Fair: large stones, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
70 Ipson	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
71 Ipson	Fair: large stones, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
72, 73 Jodero	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
74 Kade	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
75*. Lava flows				
76*:				
Lazear	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Rock outcrop.				
Badland.				
77 Losee	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
78 Losee	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
79 Losee	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
80 Luhon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
81, 82 Luhon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
83, 84 Luhon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
85, 86 Mespun	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
87 Mespun	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
88 Mikim	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
89 Mikim	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
90 Mikim	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
91, 92 Mikim	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
93 Mitch	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
94*:				
Mitch	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Riverwash.				
95 Mivida	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
96 Neto	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
97 Neto	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
98, 99, 100, 101 Notter	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
102 Notter	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
103 Notter	Good	Probable	Probable	Poor: small stones, area reclaim.
104 Notter Variant	Good	Probable	Probable	Poor: small stones, area reclaim.
105*:				
Pahreah	Poor: depth to rock.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones.
Sheege	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
106*:				
Pahreah	Poor: depth to rock.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, slope.
Sielo	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
107*:				
Pahreah	Poor: slope, depth to rock.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, slope.
Swapps	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
108*:				
Panguitch	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Mitch	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
109*:				
Panguitch	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Riverwash.				
110 Paunsaugunt	Poor: depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
111*: Paunsaugunt	Poor: depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.
Syrett	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
112*. Playas				
113 Plite	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
114 Podo	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
115*: Podo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Wiggler	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
116*: Podo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
117 Quilt	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
118 Quilt	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
119, 120 Redcreek	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
121*. Riverwash				
122*. Rock outcrop				
123*: Rock outcrop.				

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
123*:				
Podo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
124*. Rubble land				
125 Ruko	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
126*:				
Ruko	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Podo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
127 Schauson	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
128 Schauson	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
129*:				
Sevier	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Skutum	Fair: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
130*:				
Sheege	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Swapps	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
131*:				
Showalter	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, too clayey.
Guben	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
132 Shupert	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
133 Sielo	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
134 Skutum	Fair: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
135 Skutum	Fair: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
136 Swapps	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
137 Swapps	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
138 Syrett	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
139*:				
Syrett	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Frandsen	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
140*:				
Syrett	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Vanet	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
141, 142, 143 Tebbs	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
144 Tolman	Poor: depth to rock, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones, slope.
145*:				
Tolman	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
146, 147, 148 Tridell	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
149*: Tridell	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
Rock outcrop.				
150 Ustic Torrifluvents	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
151 Venture	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: cemented pan, small stones, slope.
152 Venture	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: cemented pan, small stones.
153 Venture	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: cemented pan, small stones, slope.
154* Villy Family	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
155 Waltershow	Fair: large stones, slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
156 Waltershow	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
157*: Waltershow	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Venture	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: cemented pan, small stones.
Rock outcrop.				
158 Whiteman	Poor: depth to rock, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel
159*:			
Whiteman	Poor: depth to rock, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.
Skutum	Fair: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.
160 Widtsoe	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.
161 Wiggler	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.
162*:			
Wiggler	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.
Guben	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.
163*:			
Wiggler	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.
Rock outcrop.			
Podo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.
164 Winetti	Good	Probable	Probable
165*:			
Winnemucca	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.
Hoodle	Fair: large stones.	Improbable: large stones.	Improbable: large stones.
166, 167, 168 Yarts	Good	Improbable: excess fines.	Improbable: excess fines.

See footnote at end of table.

Topsoil
Poor: depth to rock, large stones, slope.
Poor: small stones, area reclaim, slope.
Poor: small stones, area reclaim, slope.
Poor: slope, depth to rock.
Poor: depth to rock, small stones, slope.
Poor: small stones, area reclaim, slope.
Poor: depth to rock, small stones, slope.
Poor: depth to rock, small stones, slope.
Poor: small stones, area reclaim.
Poor: large stones, area reclaim, slope.
Poor: area reclaim, small stones.
Good.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
169: Venlo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
170: Zillion	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
171: Zinzer	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
172: Zyme	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
173*:				
Zyme	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, slope.
Lazear	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Rock outcrop.				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
1*:				
Ahlstrom	Slight	Slight	Percs slowly	Erodes easily, percs slowly.
Osote	Severe: slope.	Severe: seepage.	Percs slowly, slope.	Slope, large stones.
2 Alldown	Slight	Severe: piping.	Favorable	Erodes easily.
3 Alldown	Moderate: slope.	Severe: piping.	Slope	Erodes easily.
4 Alldown	Moderate: seepage.	Moderate: thin layer, piping, excess salt.	Excess salt	Erodes easily.
5 Alldown	Moderate: slope.	Severe: piping.	Slope	Erodes easily.
6 Andys	Severe: seepage, slope.	Moderate: thin layer, seepage, piping.	Slope	Slope.
7 Andys	Severe: seepage, slope.	Moderate: thin layer.	Slope	Slope.
8*: Badland.				
Cannonville	Severe: depth to rock, slope.	Severe: thin layer.	Slope, slow intake, percs slowly.	Slope, depth to rock, percs slowly.
Rock outcrop.				
9*: Badland.				
Rock outcrop.				
Paunsaugunt	Severe: depth to rock, slope.	Severe: large stones.	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
10, 11 Baldfield	Moderate: slope.	Slight	Slow intake, percs slowly, slope.	Percs slowly.
12 Barx	Moderate: seepage, slope.	Severe: piping.	Slope, soil blowing, erodes easily.	Erodes easily, soil blowing.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
13 Bayfield	Moderate: slope.	Slight	Slow intake, percs slowly, slope.	Percs slowly.
14 Befar	Moderate: slope.	Moderate: hard to pack, excess salt.	Slow intake, percs slowly, slope.	Percs slowly.
15 Behanin	Severe: seepage, slope.	Severe: piping.	Large stones, slope.	Slope, large stones.
16* Blanchard Family	Severe: seepage, slope.	Severe: seepage, piping.	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
17 Borollic Natrargids	Slight	Severe: piping.	Percs slowly, erodes easily, excess sodium.	Erodes easily.
18 Broncho	Severe: seepage.	Severe: seepage.	Droughty, slope.	Too sandy.
19, 20 Bruman	Severe: seepage.	Severe: seepage.	Large stones, droughty, slope.	Large stones, too sandy.
21, 22, 23, 24 Bruman	Severe: seepage, slope.	Severe: seepage, large stones.	Large stones, droughty, slope.	Slope, large stones, too sandy.
25 Brycan	Severe: seepage.	Severe: thin layer.	Soil blowing, slope, erodes easily.	Erodes easily, soil blowing.
26 Brycan	Severe: seepage, slope.	Severe: thin layer.	Soil blowing, slope, erodes easily.	Slope, erodes easily, soil blowing.
27 Bushvalley	Severe: depth to rock, slope.	Severe: large stones.	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
28*: Callings	Severe: slope.	Moderate: large stones.	Large stones, droughty, percs slowly.	Slope, large stones.
Winnemucca	Moderate: seepage, slope.	Severe: piping, large stones.	Large stones, droughty, percs slowly.	Large stones.
29, 30 Cannonville	Severe: depth to rock, slope.	Severe: thin layer.	Slope, slow intake, percs slowly.	Slope, depth to rock, percs slowly.
31*: Castino	Severe: slope.	Severe: large stones.	Large stones, slopes, droughty.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
31*:				
Behanin	Severe: slope, seepage.	Severe: piping.	Large stones, slope.	Slope, large stones.
32*:				
Castino	Severe: slope.	Severe: large stones.	Large stones, slope, droughty.	Large stones, slope, depth to rock.
Tica Family	Severe: depth to rock, slope.	Severe: large stones.	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
33*:				
Castino	Moderate: depth to rock, slope.	Severe: large stones.	Large stones, droughty, slope.	Large stones, depth to rock.
Winnemucca	Severe: slope.	Severe: piping, large stones.	Large stones, droughty, percs slowly.	Slope, large stones.
34*:				
Circleville	Severe: slope.	Severe: large stones.	Large stones, droughty, slope.	Slope, large stones, depth to rock.
Rock outcrop.				
35, 36 Clapper	Severe: slope.	Moderate: large stones.	Droughty, slope.	Slope, large stones.
37 Codley	Slight	Severe: piping.	Favorable	Favorable.
38 Codley	Moderate: slope.	Severe: piping.	Slope	Favorable.
39*:				
Comodore	Severe: depth to rock, slope.	Severe: large stones.	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.				
40 Crestline	Severe: seepage.	Severe: piping.	Soil blowing, slope.	Soil blowing.
41 Dalcan	Severe: slope.	Severe: large stones.	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
2 Descot	Severe: seepage.	Severe: piping.	Erodes easily	Erodes easily.
3 Descot	Severe: seepage.	Severe: piping.	Slope, erodes easily.	Erodes easily.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
44 Dimyaw Family	Severe: slope.	Severe: excess sodium.	Percs slowly, slope, excess sodium.	Slope, percs slowly.
45 Echard	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, large stones.
46*:				
Ess	Severe: slope.	Severe: large stones.	Large stones, droughty, slope.	Slope, large stones.
Callings	Severe: slope.	Moderate: large stones.	Large stones, droughty, percs slowly.	Slope, large stones.
47 Evanston	Moderate: slope.	Severe: piping.	Slope, erodes easily.	Erodes easily.
48 Evanston	Severe: slope.	Severe: piping.	Slope	Slope, erodes easily.
49 Frandsen	Severe: slope.	Severe: piping.	Slope	Slope.
50*:				
Frandsen	Moderate: seepage, slope.	Severe: piping.	Slope	Favorable.
Neto	Severe: seepage.	Severe: piping.	Droughty, soil blowing.	Too sandy, soil blowing.
51*:				
Frandsen	Severe: slope.	Severe: piping.	Slope	Slope.
Wiggler	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock, erodes easily.
52 Hughes	Slight	Slight	Percs slowly, erodes easily.	Erodes easily, percs slowly.
53*:				
Gerst Family	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock.
Rock outcrop.				
54 Greenhalgh	Moderate: seepage.	Severe: piping.	Erodes easily	Erodes easily.
55 Greenhalgh	Moderate: seepage, slope.	Severe: piping.	Slope, erodes easily.	Erodes easily.
56 Grimm	Severe: seepage.	Severe: seepage, large stones.	Large stones, droughty, soil blowing.	Large stones, too sandy.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
57 Guben	Severe: slope.	Moderate: large stones.	Droughty, slope.	Slope, large stones.
58*:				
Guben	Severe: slope.	Moderate: large stones.	Droughty, slope.	Slope, large stones.
Showalter	Severe: slope.	Moderate: large stones.	Slope, percs slowly.	Slope, large stones.
59, 60 Harol	Severe: seepage, slope.	Severe: seepage, large stones.	Large stones, droughty, slope.	Slope, large stones, too sandy.
61 Harol	Severe: slope.	Severe: large stones.	Large stones, droughty, slope.	Slope, large stones.
62*:				
Hatch	Severe: slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.
Pahreah	Severe: seepage, slope.	Severe: seepage.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
63*:				
Hatch	Severe: slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.
Swapps	Severe: slope.	Severe: thin layer.	Depth to rock, slope, large stones.	Small stones, slope, depth to rock.
64 Henrieville	Severe: seepage.	Severe: piping.	Soil blowing	Soil blowing.
65, 66, 67 Henrieville	Severe: seepage.	Severe: piping.	Soil blowing, slope.	Soil blowing.
68*:				
Hernandez Family	Moderate: slope.	Moderate: piping.	Slope	Favorable.
Clapper	Moderate: seepage, slope.	Moderate: large stones.	Droughty, slope.	Large stones.
69, 70, 71 Ipson	Severe: seepage, slope.	Severe: seepage.	Large stones, droughty, slope.	Slope, large stones, too sandy.
72 Jodero	Moderate: seepage.	Moderate: piping.	Favorable	Favorable.
73 Jodero	Moderate: seepage, slope.	Moderate: piping.	Slope	Favorable.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
74--------------- Kade	Slight---------------	Severe: piping, wetness.	Wetness, percs slowly.	Erodes easily, wetness.
75*. Lava flows				
76*:				
Lazear-----------	Severe: depth to rock, slope.	Severe: piping.	Soil blowing, depth to rock, slope.	Slope, depth to rock, soil blowing.
Rock outcrop.				
Badland.				
77, 78, 79-------- Losee	Severe: slope.	Severe: seepage.	Large stones, droughty, slope.	Slope, large stones.
80--------------- Luhon	Moderate: seepage, slope.	Severe: piping.	Slope---------------	Favorable.
81--------------- Luhon	Moderate: seepage.	Severe: piping.	Favorable------------	Large stones.
82--------------- Luhon	Moderate: seepage, slope.	Severe: piping.	Slope---------------	Large stones.
83, 84----------- Luhon	Severe: slope.	Severe: piping.	Slope---------------	Slope.
85, 86----------- Mespun	Severe: seepage.	Severe: seepage, piping.	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
87--------------- Mespun	Severe: seepage, slope.	Severe: seepage, piping.	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
88--------------- Mikim	Moderate: slope.	Moderate: piping.	Soil blowing, slope.	Soil blowing.
89--------------- Mikim	Slight---------------	Severe: piping.	Favorable------------	Favorable.
90--------------- Mikim	Moderate: slope.	Moderate: piping.	Slope---------------	Favorable.
91--------------- Mikim	Slight---------------	Moderate: piping.	Erodes easily---------	Erodes easily.
92--------------- Mikim	Moderate: slope.	Moderate: piping.	Slope, erodes easily.	Erodes easily.
93--------------- Mitch	Moderate: seepage.	Severe: piping.	Favorable------------	Erodes easily.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
94*:				
Mitch	Moderate: seepage.	Severe: piping.	Favorable	Erodes easily.
Riverwash.				
95 Mivida	Severe: seepage.	Severe: piping.	Soil blowing	Soil blowing.
96 Neto	Severe: seepage.	Severe: piping.	Droughty, soil blowing, slope.	Too sandy, soil blowing.
97 Neto	Severe: seepage.	Severe: piping.	Soil blowing, erodes easily.	Erodes easily, soil blowing.
98 Notter	Severe: seepage.	Severe: seepage.	Droughty	Too sandy.
99 Notter	Severe: seepage.	Severe: seepage.	Droughty, slope.	Too sandy.
100 Notter	Moderate: seepage, slope.	Slight	Slope	Favorable.
101 Notter	Severe: seepage.	Severe: seepage.	Droughty, slope.	Too sandy.
102, 103 Notter	Severe: seepage, slope.	Severe: seepage.	Droughty, slope.	Slope, too sandy.
104 Notter Variant	Severe: seepage.	Severe: seepage.	Favorable	Large stones, too sandy.
105*:				
Pahreah	Severe: seepage, slope.	Severe: seepage.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Sheege	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
106*:				
Pahreah	Severe: seepage, slope.	Severe: seepage.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Sielo	Moderate: slope.	Slight	Soil blowing, percs slowly, rooting depth.	Erodes easily, soil blowing.
107*:				
Pahreah	Severe: seepage, slope.	Severe: seepage.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
107*: Swapps	Severe: slope.	Severe: thin layer.	Depth to rock, slope, large stones.	Small stones, slope, depth to rock.
108*: Panguitch	Severe: seepage.	Moderate: thin layer, seepage, piping.	Droughty, slope.	Favorable.
Mitch	Moderate: seepage.	Severe: piping.	Favorable	Erodes easily.
109*: Panguitch	Severe: seepage, slope.	Moderate: thin layer, seepage, piping.	Droughty, slope.	Slope.
Riverwash.				
110 Paunsaugunt	Severe: depth to rock, slope.	Severe: large stones.	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
111*: Paunsaugunt	Severe: depth to rock, slope.	Severe: large stones.	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Syrett	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, large stones.	Large stones, droughty.	Large stones, depth to rock.
112*. Playas				
113 Plite	Severe: seepage.	Severe: piping.	Droughty, soil blowing. slope.	Too sandy, soil blowing.
114 Podo	Severe: depth to rock.	Severe: piping.	Slope, droughty, fast intake.	Depth to rock, soil blowing.
115*: Podo	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock.	Slope, large stones, depth to rock.
Wiggler	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock, erodes easily.
116*: Podo	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
116*: Rock outcrop.				
117, 118---------- Quilt	Severe: slope.	Moderate: large stones.	Large stones, percs slowly, slope.	Slope, large stones, percs slowly.
119--------------- Redcreek	Severe: depth to rock, slope.	Severe: seepage.	Slope, droughty, soil blowing.	Slope, depth to rock.
120--------------- Redcreek	Severe: depth to rock, slope.	Severe: seepage.	Slope, droughty.	Slope, large stones, depth to rock.
121*. Riverwash				
122*. Rock outcrop				
123*: Rock outcrop.				
Podo--------------	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock.	Slope, large stones, depth to rock.
124*. Rubble land				
125--------------- Ruko	Severe: depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
126*: Ruko--------------	Severe: depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Podo--------------	Severe: depth to rock, slope.	Severe: thin layer.	Depth to rock, slope.	Slope, depth to rock.
127--------------- Schauson	Moderate: slope.	Severe: piping.	Slope-----------------	Favorable.
128--------------- Schauson	Severe: slope.	Severe: piping.	Slope-----------------	Slope.
129*: Sevier-----------	Severe: slope.	Severe: hard to pack.	Soil blowing, percs slowly, slope.	Slope, depth to rock, soil blowing.
Skutum-----------	Severe: slope.	Moderate: thin layer.	Soil blowing, percs slowly, slope.	Slope, soil blowing, percs slowly.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

name and symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
	Severe: slope.	Severe: thin layer.	Depth to rock, slope, large stones.	Small stones, slope, depth to rock.
er	Moderate: seepage.	Moderate: large stones.	Large stones, droughty,	Large stones.
	Moderate: seepage, slope.	Moderate: large stones.	Droughty, slope.	Large stones.
	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Erodes easily	Erodes easily.
	Moderate: slope.	Slight	Soil blowing, percs slowly, rooting depth.	Erodes easily, soil blowing.
	Moderate: seepage, depth to rock, slope.	Moderate: thin layer.	Soil blowing, percs slowly, slope.	Soil blowing, percs slowly.
	Severe: slope.	Moderate: thin layer.	Soil blowing, percs slowly, slope.	Slope, soil blowing, percs slowly.
	Severe: slope.	Severe: thin layer.	Depth to rock, slope, large stones.	Small stones, slope, depth to rock.
	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, large stones.	Large stones, droughty.	Large stones, depth to rock.
	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, large stones.	Large stones, droughty.	Large stones, depth to rock.
n	Moderate: seepage.	Severe: piping.	Favorable	Favorable.
	Severe: slope.	Moderate: thin layer, large stones.	Large stones, droughty.	Slope, large stones, depth to rock.
	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock, slope.	Slope, depth to rock.

footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Featu
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation
141----- Tebbs	Moderate: seepage, slope.	Severe: piping.	Soil blowing, slope.
142, 143----- Tebbs	Moderate: seepage.	Severe: piping.	Favorable-----
144----- Tolman	Severe: depth to rock, slope.	Severe: large stones.	Slope, large stones, droughty.
145*:			
Tolman-----	Severe: depth to rock, slope.	Severe: large stones.	Slope, large stones, droughty.
Rock outcrop.			
146----- Tridell	Severe: seepage.	Severe: piping, large stones.	Large stones, droughty, slope.
147, 148----- Tridell	Severe: seepage, slope.	Severe: large stones.	Large stones, droughty, slope.
149*:			
Tridell-----	Severe: seepage, slope.	Severe: piping, large stones.	Large stones, droughty, slope.
Rock outcrop.			
150----- Ustic Torrifluvents	Severe: seepage.	Severe: seepage.	Droughty, slope, floods.
151, 152, 153----- Venture	Severe: cemented pan, slope.	Severe: large stones.	Large stones, droughty, cemented pan.
154*----- Villy Family	Slight-----	Severe: wetness.	Wetness, percs slowly, excess salt.
155, 156----- Waltershow	Severe: seepage, slope.	Severe: seepage, large stones.	Large stones, percs slowly, slope.
157*:			
Waltershow-----	Severe: seepage, slope.	Severe: seepage, large stones.	Large stones, percs slowly, slope.
Venture-----	Severe: cemented pan, slope.	Severe: large stones.	Large stones, droughty, cemented pan.
Rock outcrop.			

See footnote at end of table.

es affecting--
Terraces and diversions
Erodes easily, too sandy, soil blowing.
Erodes easily, too sandy.
Slope, large stones, depth to rock.
Slope, large stones, depth to rock.
Large stones.
Slope, large stones.
Slope, large stones.
Large stones, soil blowing.
Slope, large stones, cemented pan.
Erodes easily, wetness, percs slowly.
Slope, large stones, too sandy.
Slope, large stones, too sandy.
Slope, large stones, cemented pan.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
158 Whiteman	Severe: depth to rock.	Severe: large stones.	Large stones, droughty, percs slowly.	Large stones, depth to rock.
159*:				
Whiteman	Severe: depth to rock, slope.	Severe: large stones.	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Skutum	Severe: slope.	Moderate: thin layer.	Soil blowing, percs slowly, slope.	Slope, soil blowing, percs slowly.
160 Widtsoe	Severe: slope.	Severe: seepage, large stones.	Large stones, droughty, slope.	Slope, large stones, too sandy.
161 Wiggler	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock, erodes easily.
162*:				
Wiggler	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock, erodes easily.
Guben	Severe: slope.	Moderate: large stones.	Droughty, slope.	Slope, large stones.
163*:				
Wiggler	Severe: depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock, erodes easily.
Rock outcrop.				
Podo	Severe: depth to rock, slope.	Severe: thin layer.	Droughty, depth to rock.	Slope, large stones, depth to rock.
164 Winetti	Severe: seepage.	Severe: seepage.	Slope, droughty.	Favorable.
165*:				
Winnemucca	Severe: slope.	Severe: piping, large stones.	Large stones, droughty, percs slowly.	Slope, large stones.
Hoodle	Severe: seepage.	Severe: seepage, large stones.	Large stones, droughty, slope.	Large stones.
166 Yarts	Severe: seepage.	Severe: piping.	Favorable	Favorable.
167, 168 Yarts	Severe: seepage.	Severe: piping.	Soil blowing, slope.	Soil blowing.
169 Yenlo	Moderate: slope.	Moderate: piping.	Slope	Favorable.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Irrigation	Terraces and diversions
170--------------- Zillion	Severe: seepage, slope.	Severe: seepage.	Large stones, droughty, slope.	Slope, large stones.
171--------------- Zinzer	Severe: slope.	Severe: thin layer.	Slope, erodes easily.	Slope, erodes easily.
172--------------- Zyme	Severe: depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock.	Slope, depth to rock, percs slowly.
173*:				
Zyme--------------	Severe: depth to rock, slope.	Severe: thin layer.	Slow intake, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.
Lazear-----------	Severe: depth to rock, slope.	Severe: piping.	Soil blowing, depth to rock, slope.	Slope, depth to rock, soil blowing.
Rock outcrop.				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1*:											
Ahlstrom--------	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	85-95	75-85	25-35	5-15
	7-14	Silty clay loam, silty clay.	CL	A-6, A-7	0	100	100	90-100	80-95	35-50	15-25
	14-60	Stratified loam to silty clay.	CL	A-6, A-7	0	100	100	85-95	75-90	30-45	10-20
Osote-----------	0-9	Silty clay loam	CL	A-6	0	100	100	95-100	80-90	30-40	10-15
	9-33	Silty clay loam, loam, clay loam.	CL-ML, CL	A-4, A-6	0	100	100	90-95	75-85	25-40	5-15
	33-60	Very gravelly loam, extremely cobbly loam, very gravelly sandy loam.	GM, GM-GC	A-2, A-4, A-1	20-60	45-60	40-55	30-50	15-40	15-30	NP-10
2, 3------------ Alldown	0-10	Clay loam--------	CL	A-6	0	100	100	90-100	70-80	30-40	10-15
	10-60	Stratified very fine sandy loam to clay loam.	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-40	5-15
4--------------- Alldown	0-4	Loam-------------	CL-ML, ML	A-4	0	100	100	85-95	60-70	25-35	5-10
	4-12	Sandy loam-------	SM	A-4, A-2	0	100	100	60-70	30-40	20-25	NP-5
	12-49	Loam, clay loam	CL	A-6	0	100	100	85-95	65-75	30-40	10-20
	49-60	Sandy clay loam	SM-SC, CL-ML, SC, CL	A-4, A-6	0	100	100	80-90	35-55	25-35	5-15
5--------------- Alldown	0-10	Clay loam--------	CL	A-6	0	100	100	90-100	70-80	30-40	10-15
	10-60	Stratified very fine sandy loam to clay loam.	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-40	5-15
6--------------- Andys	0-8	Loam-------------	CL-ML	A-4	0	90-100	85-95	75-90	55-70	25-30	5-10
	8-30	Loam-------------	CL-ML	A-4	0	90-100	85-95	75-90	55-70	20-30	5-10
	30-60	Gravelly loam, gravelly sandy loam.	GM, SM, SM-SC, GM-GC	A-2, A-4	0-15	65-80	60-75	45-60	25-45	20-30	NP-10
7--------------- Andys	0-7	Very cobbly loam	GM-GC	A-4	30-40	55-65	50-60	40-55	35-45	20-35	5-10
	7-36	Gravelly loam----	GM-GC, SM-SC	A-4	5-10	65-75	60-70	50-65	35-50	20-35	5-10
	36-60	Loam-------------	CL-ML	A-4	0	90-100	90-100	80-95	55-70	20-35	5-10
8*: Badland.											
Cannonville-----	0-7	Clay-------------	CL	A-7	0	100	100	90-100	75-95	40-50	20-30
	7	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
9*: Badland.											
Rock outcrop.											

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
9*:											
Paunsaugunt-----	0-3	Gravelly loam----	GM-GC	A-4	0-5	50-65	50-65	45-55	40-50	20-30	5-10
	3-15	Very cobbly loam, very cobbly sandy loam.	SM, SM-SC	A-1, A-2, A-4	35-60	75-85	70-80	40-60	20-50	15-25	NP-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
10, 11-----------	0-2	Clay-------------	CL	A-6, A-7	0	100	100	90-100	75-95	35-50	15-30
Baldfield	2-60	Clay-------------	CL	A-6, A-7	0	100	100	90-100	75-95	35-50	15-30
12---------------	0-5	Fine sandy loam	SM, SM-SC, CL-ML, ML	A-4	0	100	100	70-95	40-65	20-30	NP-10
Barx	5-12	Sandy clay loam, loam, clay loam.	SM-SC, SC, CL, CL-ML	A-4, A-6	0-10	80-100	75-100	60-100	35-75	20-40	5-20
	12-60	Sandy loam, sandy clay loam, loam.	SM-SC, CL, CL-ML, SC	A-2, A-4, A-6	0-10	80-100	75-100	45-95	30-70	20-35	5-15
13---------------	0-3	Clay-------------	CL	A-7	0	100	100	90-100	75-95	40-50	15-30
Bayfield	3-60	Clay-------------	CL	A-7	0	100	100	90-100	75-95	40-50	15-30
14---------------	0-2	Clay-------------	CL, CH	A-7	0	100	100	90-100	75-90	45-55	25-35
Befar	2-60	Clay, silty clay, clay loam.	CL, CH	A-7	0	100	100	90-100	75-90	35-55	15-35
15---------------	0-17	Loam-------------	CL-ML	A-4	0	90-100	85-95	75-85	60-70	20-30	5-10
Behanin	17-44	Very cobbly loam	CL-ML	A-4	40-50	80-90	75-85	65-75	50-60	20-30	5-10
	44-60	Extremely cobbly sandy loam, extremely gravelly loam, extremely cobbly loam.	SM, GM	A-2, A-4, A-1	20-65	30-75	25-70	20-60	10-50	20-30	NP-5
16*--------------	0-5	Sand-------------	SM	A-2	0	100	100	60-85	15-35	---	NP
Blanchard	5-55	Sand, fine sand	SM	A-2	0	100	100	60-85	15-35	---	NP
Family	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
17---------------	0-2	Silt loam--------	CL-ML	A-4	0	100	100	90-100	70-90	25-30	5-10
Borollic	2-15	Clay loam--------	CL	A-6	0	100	100	90-100	70-80	30-40	15-20
Natrargids	15-60	Clay loam, loam	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-35	5-15
18---------------	0-6	Very gravelly sandy loam.	GM-GC	A-2	20-30	50-60	45-55	25-35	15-20	20-30	5-10
Broncho	6-20	Sandy loam-------	SM	A-2, A-4	0	95-100	95-100	60-70	30-40	20-25	NP-5
	20-43	Very gravelly fine sand.	GP-GM, GM	A-1	15-20	40-50	35-45	20-30	5-15	---	NP
	43-60	Gravelly loamy fine sand.	SM	A-2	5-10	75-85	65-75	55-65	15-25	---	NP
19---------------	0-10	Loam-------------	CL-ML	A-4	0	95-100	95-100	85-95	60-75	25-30	5-10
Bruman	10-39	Very gravelly sandy loam, very gravelly loam.	GM, GM-GC	A-1, A-2	5-15	40-50	35-45	20-40	15-30	15-25	NP-10
	39-60	Very gravelly sand, very gravelly loamy sand.	GM, GP, GP-GM	A-1	15-20	40-50	35-45	10-30	0-15	---	NP

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
20--------------- Bruman	0-10	Gravelly loam----	GM-GC, SM-SC	A-4	5-10	65-85	60-75	50-70	35-50	25-30	5-10
	10-31	Very gravelly sandy loam, very gravelly loam.	GM, GM-GC	A-1, A-2	5-15	40-50	35-45	20-40	15-30	15-25	NP-10
	31-60	Very gravelly sand, very gravelly loamy sand.	GM, GP, GP-GM	A-1	15-20	40-50	35-45	10-30	0-15	---	NP
21, 22----------- Bruman	0-9	Cobbly loam------	SM-SC, SM	A-4	20-30	75-85	70-80	50-70	35-50	20-30	NP-10
	9-31	Very cobbly sandy loam.	GM, SM, GM-GC, SM-SC	A-1, A-2	40-50	55-65	50-60	30-40	15-30	20-30	NP-10
	31-60	Extremely cobbly sand, very cobbly sand.	GP, GP-GM	A-1	55-60	45-65	40-60	20-45	0-10	---	NP
23, 24----------- Bruman	0-8	Very cobbly loam	GM-GC	A-2, A-4	35-45	50-60	45-55	35-50	25-40	25-30	5-10
	8-38	Very cobbly sandy loam.	SM, GM	A-1	35-45	55-70	50-65	30-45	15-25	15-25	NP-5
	38-60	Very gravelly sand, very gravelly loamy sand.	GM, GP, GP-GM	A-1	15-20	40-50	35-45	10-30	0-15	---	NP
25--------------- Brycan	0-4	Very fine sandy loam.	ML	A-4	0	100	100	85-95	50-65	20-25	NP-5
	4-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
26--------------- Brycan	0-12	Very fine sandy loam.	ML	A-4	0	100	100	85-95	50-65	20-25	NP-5
	12-37	Sandy clay loam	SM-SC	A-4	0	100	100	80-90	35-50	25-35	5-10
	37-47	Sandy loam-------	SM	A-4	0	100	100	60-70	35-45	20-25	NP-5
	47-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
27--------------- Bushvalley	0-11	Very stony loam	GM-GC, SM-SC	A-2, A-4	40-60	55-75	50-70	40-65	30-50	20-30	5-10
	11-19	Very cobbly sandy clay loam, very stony sandy clay loam.	SC, GC	A-2, A-6	30-55	65-85	50-70	40-60	20-40	30-35	10-15
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
28*:											
Callings--------	0-11	Loam-------------	CL-ML	A-4	0	80-90	75-85	60-75	50-70	20-30	5-10
	11-18	Gravelly loam, gravelly fine sandy loam, cobbly loam.	CL-ML, SM-SC	A-4	15-20	75-85	70-80	55-75	35-70	20-30	5-10
	18-32	Very gravelly clay loam, very cobbly clay, very cobbly clay loam.	GC	A-6, A-7	15-45	50-60	45-55	40-50	35-45	35-50	15-25
	32-60	Extremely cobbly clay loam, extremely gravelly clay loam, extremely gravelly loam.	GC	A-2, A-6	30-65	40-55	35-50	30-45	25-40	30-40	10-15
Winnemucca------	0-11	Gravelly silt loam.	CL-ML	A-4	0-5	70-80	65-75	60-70	50-60	20-30	5-10
	11-28	Very cobbly clay loam, very cobbly clay, extremely cobbly clay loam.	CL	A-6, A-7	45-70	90-100	85-95	80-90	75-80	30-50	10-25
	28-60	Extremely stony loam.	CL-ML	A-4	60-80	90-100	85-95	75-85	55-70	20-30	5-10
29---------------	0-7	Clay-------------	CL	A-7	0	100	100	90-100	75-95	40-50	20-30
Cannonville	7	Weathered bedrock	---	---	---	---	---	---	---	---	---
30---------------	0-2	Very stony clay	GC	A-7	45-55	60-70	55-65	45-60	40-50	40-50	20-30
Cannonville	2-18	Clay-------------	CL, CH	A-7	0	95-100	95-100	85-100	70-90	40-55	20-30
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
31*:											
Castino---------	0-3	Extremely cobbly loam.	GM-GC	A-4	65-75	60-70	50-65	40-55	35-45	20-30	5-10
	3-14	Gravelly loam, gravelly clay loam.	GC, CL	A-6	5-15	65-75	60-70	50-65	40-55	25-35	10-15
	14-38	Very cobbly clay, extremely cobbly clay loam, extremely cobbly clay.	CL	A-6, A-7	60-80	80-95	75-90	70-85	65-80	35-50	15-25
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Behanin---------	0-17	Loam-------------	CL-ML	A-4	0	90-100	85-95	75-85	60-70	20-30	5-10
	17-44	Very cobbly loam	CL-ML	A-4	40-50	80-90	75-85	65-75	50-60	20-30	5-10
	44-60	Extremely cobbly sandy loam, extremely gravelly loam, extremely cobbly loam.	SM, GM	A-2, A-4, A-1	20-65	30-75	25-70	20-60	10-50	20-30	NP-5

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
32*:											
Castino---------	0-3	Extremely cobbly loam.	GM-GC	A-4	65-75	60-70	50-65	40-55	35-45	20-30	5-10
	3-14	Gravelly loam, gravelly clay loam.	GC, CL	A-6	5-15	65-75	60-70	50-65	40-55	25-35	10-15
	14-38	Very cobbly clay, extremely cobbly clay loam, extremely cobbly clay.	CL	A-6, A-7	60-80	80-95	75-90	70-85	65-80	35-50	15-25
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tica Family-----	0-5	Cobbly loam------	CL-ML	A-4	25-35	80-90	75-85	65-75	50-60	20-30	5-10
	5-18	Very cobbly clay loam, very stony clay, very stony clay loam.	CL	A-6, A-7	45-60	90-100	85-95	80-90	65-80	35-45	15-25
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
33*:											
Castino---------	0-8	Gravelly silt loam.	GM-GC, GC, CL-ML, CL	A-4, A-6	5-15	65-75	60-70	50-65	40-55	25-35	5-15
	8-38	Very cobbly clay, extremely cobbly clay loam.	CL	A-6, A-7	60-80	80-95	75-90	70-85	65-80	35-50	15-25
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Winnemucca------	0-16	Gravelly loam----	CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	16-60	Very cobbly clay loam, very cobbly clay, extremely cobbly clay loam.	CL	A-6, A-7	45-70	90-100	85-95	80-90	75-80	30-50	10-25
34*:											
Circleville-----	0-2	Very gravelly loam.	GM-GC	A-2	5-10	35-45	30-40	25-35	20-30	20-30	5-10
	2-9	Very gravelly clay loam, very gravelly loam, very cobbly clay loam.	GM-GC, GC, CL-ML, CL	A-4, A-6	10-45	55-70	50-65	45-60	35-55	25-40	5-15
	9-24	Very cobbly loam, very gravelly loam, very cobbly sandy loam.	GM-GC, GM	A-4, A-2	20-55	55-65	50-60	35-55	20-45	20-30	NP-10
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
35---------------	0-3	Cobbly loam------	CL-ML	A-4	25-35	80-90	75-85	60-70	50-60	25-35	5-10
Clapper	3-10	Cobbly loam------	SM-SC	A-4	10-20	75-85	70-80	55-75	40-50	25-35	5-10
	10-60	Very gravelly loam.	GM-GC	A-2	15-25	40-50	35-45	25-40	20-35	25-35	5-10

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
36 Clapper	0-3	Cobbly loam	CL-ML	A-4	25-35	80-90	75-85	60-70	50-60	25-35	5-10
	3-10	Cobbly loam	SM-SC	A-4	10-20	75-85	70-80	55-75	40-50	25-35	5-10
	10-60	Very gravelly loam.	GM-GC	A-2	15-25	40-50	35-45	25-40	20-35	25-35	5-10
37 Codley	0-7	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	75-95	25-35	5-15
	7-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	95-100	75-95	25-40	5-15
38 Codley	0-7	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	75-95	25-35	5-15
	7-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	95-100	75-95	25-40	5-15
39*: Comodore	0-6	Extremely cobbly clay loam.	GC	A-2	45-55	40-50	35-45	30-40	25-35	30-40	10-15
	6-13	Very cobbly clay loam.	GC	A-6	30-45	55-75	50-70	45-60	40-50	30-40	10-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
40 Crestline	0-3	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	65-85	35-55	20-25	NP-5
	3-60	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	65-85	35-55	20-25	NP-5
41 Dalcan	0-4	Very cobbly loam	GM-GC	A-2, A-4	35-55	50-65	45-60	40-55	30-45	25-35	5-10
	4-15	Very gravelly clay, very gravelly clay loam, very cobbly clay.	GC	A-2, A-6, A-7	15-35	40-70	35-65	30-60	25-50	35-50	15-25
	15-22	Very cobbly clay loam, extremely gravelly sandy clay loam.	GP-GC, GC	A-2	30-55	20-50	15-45	10-40	5-30	30-40	10-15
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
42, 43 Descot	0-5	Silt loam	CL-ML	A-4	0	100	100	80-95	75-85	20-30	5-10
	5-60	Very fine sandy loam, fine sandy loam.	ML	A-4	0	100	100	85-95	50-60	15-25	NP-5
44 Dimyaw Family	0-7	Gravelly loam	GM-GC, SM-SC	A-4	0	60-75	55-70	45-55	35-45	25-30	5-10
	7-27	Clay loam	CL	A-6, A-7	0	95-100	90-100	85-100	70-95	35-45	15-20
	27-60	Clay	CL	A-7	0	100	100	90-100	75-95	40-50	15-25
45 Echard	0-5	Loam	CL, CL-ML	A-4, A-6	5-10	85-95	80-90	70-80	60-70	25-35	5-15
	5-25	Clay, clay loam, cobbly clay loam.	CL	A-6, A-7	5-20	85-95	80-95	75-85	70-80	35-45	15-25
	25-60	Cobbly loam, gravelly loam, cobbly clay loam.	CL, CL-ML	A-4, A-6	5-20	85-95	80-90	75-85	70-80	25-35	5-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
46*: Ess-------------	0-11	Gravelly fine sandy loam.	SM	A-2	5-10	70-85	60-75	40-65	25-35	15-20	NP-5
	11-23	Very cobbly clay loam, extremely cobbly clay loam.	SC, GC, CL	A-6	50-85	60-85	50-75	45-75	35-60	30-40	10-15
	23-60	Extremely cobbly loam, extremely cobbly sandy loam.	SM-SC, GM-GC	A-2, A-4	65-85	60-85	50-75	40-60	20-40	20-25	5-10
Callings--------	0-11	Loam-------------	CL-ML	A-4	0	80-90	75-85	60-75	50-70	20-30	5-10
	11-18	Gravelly loam, gravelly fine sandy loam, cobbly loam.	CL-ML, SM-SC	A-4	15-20	75-85	70-80	55-75	35-70	20-30	5-10
	18-32	Very gravelly clay loam, very cobbly clay, very cobbly clay loam.	GC	A-6, A-7	15-45	50-60	45-55	40-50	35-45	35-50	15-25
	32-60	Extremely cobbly clay loam, extremely gravelly clay loam, extremely gravelly loam.	GC	A-2, A-6	30-65	40-55	35-50	30-45	25-40	30-40	10-15
47-------------- Evanston	0-4	Loam-------------	CL-ML	A-4	0	100	100	85-95	60-75	20-30	5-10
	4-25	Clay loam, loam	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-35	5-15
	25-41	Clay loam, loam	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-35	5-15
	41-60	Sandy loam-------	SM	A-2, A-4	0	100	100	50-75	30-40	20-25	NP-5
48-------------- Evanston	0-5	Very cobbly loam	CL-ML	A-4	45-50	70-90	65-85	55-75	50-60	20-30	5-10
	5-25	Clay loam, loam	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-35	5-15
	25-40	Clay loam, loam	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-80	25-35	5-15
	40-60	Sandy loam-------	SM	A-2, A-4	0	100	100	50-75	30-40	20-25	NP-5
49-------------- Frandsen	0-3	Loam-------------	CL-ML	A-4	0-5	90-100	85-100	70-95	55-75	25-30	5-10
	3-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	70-95	55-80	25-40	5-15
50*: Frandsen--------	0-2	Loam-------------	CL-ML	A-4	0-5	90-100	85-100	70-95	55-75	25-30	5-10
	2-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	70-95	55-80	25-40	5-15
Neto------------	0-2	Sandy loam-------	SM	A-4	0	100	95-100	60-70	35-40	20-25	NP-5
	2-38	Stratified sandy loam to loamy sand.	SM	A-2	0	90-100	85-95	55-65	25-35	15-25	NP-5
	38-60	Extremely gravelly loamy sand.	GP-GM	A-1	0	20-30	15-25	10-20	5-10	---	NP
51*: Frandsen--------	0-5	Gravelly loam----	GM-GC, SM-SC	A-4	5-15	60-75	55-65	45-65	35-50	25-30	5-10
	5-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	70-95	55-80	25-40	5-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
51*:											
Wiggler	0-7	Very cobbly loam	GM-GC	A-4	0	60-70	55-65	45-55	35-45	25-30	5-10
	7-19	Loam, clay loam	CL-ML, CL	A-4, A-6	0	90-100	85-100	75-100	60-80	25-35	5-15
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---
52	0-4	Silty clay loam	CL	A-6	0	100	100	95-100	90-95	30-40	10-15
Fughes	4-53	Silty clay loam, silty clay, clay.	CL	A-6, A-7	0	100	100	90-100	75-95	35-50	15-30
	53-60	Clay loam	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-25
53*:											
Gerst Family	0-3	Loam	CL-ML	A-4	0	100	100	85-95	60-75	25-35	5-10
	3-12	Loam	CL-ML	A-4	0	100	100	85-95	60-75	25-35	5-10
	12	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
54, 55	0-2	Silt loam	CL-ML	A-4	0	100	100	95-100	70-90	25-30	5-10
Greenhalgh	2-60	Silt loam, loam	CL-ML	A-4	0	100	100	95-100	80-95	25-30	5-10
56	0-8	Sandy loam	SM, SM-SC	A-2, A-4	0	95-100	80-95	50-70	30-40	15-25	NP-10
Grimm	8-60	Extremely gravelly loamy sand, extremely gravelly sand, very cobbly sand.	GP-GM, GP, SP-SM, SP	A-1	20-45	35-65	30-60	10-40	0-15	---	NP
57	0-4	Gravelly loam	GM-GC	A-4	0-5	55-65	50-60	40-55	35-45	20-30	5-10
Guben	4-14	Very gravelly sandy clay loam, very gravelly clay loam, gravelly loam.	GM-GC, GC	A-2, A-4, A-6	5-15	35-65	30-60	25-45	15-40	25-40	5-20
	14-60	Extremely gravelly sandy clay loam, very gravelly loam, extremely gravelly sandy loam.	GM-GC, GC	A-2	15-30	30-40	25-35	15-30	10-25	25-35	5-15
58*:											
Guben	0-4	Gravelly loam	GM-GC	A-4	0-5	55-65	50-60	40-55	35-45	20-30	5-10
	4-14	Very gravelly sandy clay loam, very gravelly clay loam, gravelly loam.	GM-GC, GC	A-2, A-4, A-6	5-15	35-65	30-60	25-45	15-40	25-40	5-20
	14-60	Extremely gravelly sandy clay loam, very gravelly loam, extremely gravelly sandy loam.	GM-GC, GC	A-2	15-30	30-40	25-35	15-30	10-25	25-35	5-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

ame and ymbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
er--------	0-10	gravelly loam----	CL-ML, CL	A-4, A-6	0	65-85	60-75	55-70	50-60	25-35	5-15
	10-30	Very gravelly clay loam, very gravelly clay, very cobbly clay.	GC	A-6, A-7	15-35	55-70	50-65	45-60	35-50	35-50	15-25
	30-60	Very gravelly sandy clay loam, gravelly loam, cobbly loam.	GM-GC, GC, SC, SM-SC	A-4, A-6, A-2	15-30	45-75	40-75	35-65	25-50	25-35	5-15
----------	0-8	Very cobbly loam	GM-GC, GC	A-2, A-4, A-6	45-55	55-65	50-60	40-55	20-45	25-35	5-15
	8-26	Very gravelly clay loam, very cobbly clay loam, very cobbly sandy clay loam.	GC	A-2, A-6	20-40	45-65	40-60	35-55	30-50	30-40	10-15
	26-60	Extremely cobbly sand, extremely cobbly loamy sand, very gravelly sandy loam.	GP-GM, GP	A-1	30-55	35-55	30-50	20-30	0-10	---	NP
----------	0-5	Very cobbly loam	GM-GC, GC	A-2, A-4, A-6	45-55	55-65	50-60	40-55	20-45	25-35	5-15
	5-25	Very gravelly clay loam, very cobbly clay loam, very cobbly sandy clay loam.	GC	A-2, A-6	20-40	45-65	40-60	35-55	30-50	30-40	10-15
	25-60	Extremely cobbly sand, extremely cobbly loamy sand, very gravelly sandy loam.	GP-GM, GP	A-1	30-55	35-55	30-50	20-30	0-10	---	NP
----------	0-5	Very cobbly loam	GM-GC	A-4	35-45	60-70	55-65	40-55	35-45	25-35	5-10
	5-25	Very cobbly clay loam.	GC, CL	A-6	45-55	60-70	55-65	45-65	40-55	30-40	10-15
	25-60	Very cobbly clay loam.	GC	A-6	50-60	60-70	55-65	45-60	40-50	30-40	10-15
----------	0-2	Loam-------------	CL-ML	A-4	0	100	95-100	80-95	60-75	20-30	5-10
	2-23	Clay loam, silty clay loam, clay.	CL	A-6, A-7	0	100	95-100	85-95	80-90	35-50	15-25
	23-36	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	95-100	90-95	75-90	25-35	5-15
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---

otnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
62*:											
Pahreah	0-1	Very gravelly loam.	GM-GC	A-2	0	35-45	30-40	25-40	20-30	25-35	5-10
	1-12	Very gravelly loam, very gravelly clay loam.	GM-GC	A-2	0	40-50	35-45	30-40	25-35	25-35	5-10
	12-26	Extremely gravelly loam, extremely gravelly silt loam.	GP-GM, GM-GC	A-2	0	15-25	10-20	5-20	5-20	25-35	5-10
	26-38	Extremely cobbly loam, extremely cobbly silt loam.	GM-GC	A-2	55-70	25-35	20-30	15-30	10-25	25-35	5-10
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
63*:											
Hatch	0-2	Loam	CL-ML	A-4	0	100	95-100	80-95	60-75	20-30	5-10
	2-23	Clay loam, silty clay loam, clay.	CL	A-6, A-7	0	100	95-100	85-95	80-90	35-50	15-25
	23-36	Silt loam	CL-ML, CL	A-4, A-6	0	100	95-100	90-95	75-90	25-35	5-15
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
Swapps	0-3	Gravelly loam	SM-SC, CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	3-8	Gravelly loam, gravelly clay loam, cobbly clay loam.	GC, SC	A-6	0-30	60-75	55-70	45-60	40-50	30-40	10-20
	8-23	Very gravelly loam, very gravelly clay loam, very cobbly loam.	GM-GC, GC	A-2	5-45	40-50	30-45	20-35	15-30	20-35	5-15
	23	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
64 Henrieville	0-12	Sandy loam	SM	A-2, A-4	0	100	100	60-70	30-40	20-25	NP-5
	12-53	Sandy loam	SM	A-2, A-4	0	100	100	60-75	30-40	20-25	NP-5
	53-60	Loamy sand	SM	A-2	0	100	100	50-75	15-35	---	NP
65 Henrieville	0-5	Sandy loam	SM	A-2, A-4	0	100	100	60-70	30-40	20-25	NP-5
	5-39	Sandy loam	SM	A-2, A-4	0	100	100	60-75	30-40	20-25	NP-5
	39-60	Sandy loam, loam	SM, ML	A-4	0	100	100	70-90	40-60	20-25	NP-5
66 Henrieville	0-12	Sandy loam	SM	A-2, A-4	0	100	100	60-70	30-40	20-25	NP-5
	12-53	Sandy loam	SM	A-2, A-4	0	100	100	60-75	30-40	20-25	NP-5
	53-60	Loamy sand	SM	A-2	0	100	100	50-75	15-35	---	NP
67 Henrieville	0-5	Sandy loam	SM	A-2, A-4	0	100	100	60-70	30-40	20-25	NP-5
	5-60	Sandy loam, loam	SM, ML	A-4	0	100	100	70-90	40-60	20-25	NP-5
68*:											
Hernandez Family	0-3	Loam	CL-ML	A-4	0	100	100	85-95	60-80	25-35	5-10
	3-60	Clay loam	CL	A-6	0	100	100	90-100	70-85	30-40	10-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
68*:											
Clapper----------	0-3	Cobbly loam------	CL-ML	A-4	25-35	80-90	75-85	60-70	50-60	25-35	5-10
	3-10	Cobbly loam------	SM-SC	A-4	10-20	75-85	70-80	55-75	40-50	25-35	5-10
	10-60	Very gravelly loam.	GM-GC	A-2	15-25	40-50	35-45	25-40	20-35	25-35	5-10
69---------------- Ipson	0-6	Cobbly loam------	SM-SC, CL-ML	A-4	20-35	75-85	70-80	60-70	45-55	25-30	5-10
	6-14	Very gravelly clay loam, very gravelly loam, very cobbly loam.	GM-GC, GC	A-4, A-6	25-35	55-65	50-60	45-55	35-45	25-40	5-15
	14-36	Very gravelly loam, very gravelly sandy loam, very gravelly sandy clay loam.	GM-GC, GM	A-1, A-2, A-4	10-30	35-65	30-60	20-55	10-45	20-30	NP-10
	36-60	Very gravelly sand.	GP, GP-GM, SP, SP-SM	A-1	10-30	40-65	30-60	15-40	0-10	---	NP
70---------------- Ipson	0-3	Very cobbly loam	GM-GC, SM-SC	A-4	40-50	60-75	55-70	45-65	35-45	25-30	5-10
	3-10	Very gravelly clay loam, very gravelly loam, very cobbly loam.	GM-GC, GC	A-4, A-6	25-35	55-65	50-60	45-55	35-45	25-40	5-15
	10-60	Very cobbly loam, very cobbly sandy loam.	SM-SC, GM-GC	A-2, A-4	30-60	60-90	60-75	45-70	25-50	20-35	5-10
71---------------- Ipson	0-4	Very stony loam	GM-GC, SM-SC	A-4	40-50	60-75	55-70	45-65	35-45	25-30	5-10
	4-16	Very gravelly clay loam, very gravelly loam, very cobbly loam.	GM-GC, GC	A-4, A-6	25-35	55-65	50-60	45-55	35-45	25-40	5-15
	16-38	Very gravelly loam, very gravelly sandy loam, very gravelly sandy clay loam.	GM-GC, GM	A-1, A-2, A-4	10-30	35-65	30-60	20-55	10-45	20-30	NP-10
	38-60	Very cobbly loam, very cobbly sandy loam.	SM-SC, GM-GC	A-2, A-4	30-60	60-90	60-75	45-70	25-50	20-35	5-10
72---------------- Jodero	0-28	Loam-------------	CL-ML, ML	A-4	0	100	100	85-95	60-75	25-35	5-10
	28-60	Loam-------------	CL-ML, ML	A-4	0	85-100	80-100	70-90	55-75	25-35	5-10
73---------------- Jodero	0-24	Loam-------------	CL-ML, ML	A-4	0	100	100	85-95	60-75	25-35	5-10
	24-60	Loam-------------	CL-ML, ML	A-4	0	85-100	80-100	70-90	55-75	25-35	5-10
74---------------- Kade	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	90-100	75-85	25-35	5-15
	10-32	Silty clay-------	CL	A-6, A-7	0	100	100	90-100	90-95	35-50	15-25
	32-60	Silt loam, clay loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-85	25-40	5-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
75*. Lava flows											
76*: Lazear----------	0-3	Gravelly sandy loam.	SM	A-1	5-10	60-70	55-65	30-40	15-25	20-30	NP-5
	3-14	Loam------------	CL-ML	A-4	0	95-100	90-100	75-90	55-75	25-35	5-10
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Badland.											
77--------------- Losee	0-4	Gravelly loam----	CL-ML	A-4	0	75-85	65-75	60-70	50-60	20-30	5-10
	4-17	Gravelly clay loam, very gravelly sandy clay loam.	GM-GC, GC	A-2, A-4, A-6	15-30	45-75	40-70	30-65	20-50	25-40	5-15
	17-60	Extremely gravelly loam, extremely cobbly loam, extremely gravelly sandy loam.	GM-GC, GM	A-2, A-1	15-40	25-45	20-40	15-35	10-30	20-30	NP-10
78--------------- Losee	0-4	Gravelly sandy loam.	SM-SC, SM	A-1, A-2	0	75-85	65-75	45-55	20-30	20-30	NP-10
	4-17	Gravelly clay loam, very gravelly sandy clay loam.	GM-GC, GC	A-2, A-4, A-6	15-30	45-75	40-70	30-65	20-50	25-40	5-15
	17-60	Extremely gravelly loam, extremely cobbly loam, extremely gravelly sandy loam.	GM-GC, GM	A-2, A-1	15-40	25-45	20-40	15-35	10-30	20-30	NP-10
79--------------- Losee	0-4	Gravelly loam----	CL-ML	A-4	0	75-85	65-75	60-70	50-60	20-30	5-10
	4-12	Gravelly clay loam, very cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	15-30	45-75	40-70	30-65	20-50	25-40	5-15
	12-60	Extremely gravelly loam, extremely cobbly loam, extremely gravelly sandy loam.	GM-GC, GM	A-2, A-1	15-40	25-45	20-40	15-35	10-30	20-30	NP-10
80--------------- Luhon	0-12	Loam-------------	CL-ML, ML	A-4	0	85-100	80-100	70-90	50-65	25-35	5-10
	12-48	Loam-------------	CL-ML, ML	A-4	0	90-100	85-100	75-95	60-75	25-35	5-10
	48-60	Sandy loam, gravelly sandy loam.	SM	A-1, A-2	0-10	70-95	65-90	40-60	25-35	20-25	NP-5

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
81, 82-----------	0-6	Loam------------	CL-ML, ML	A-4	0	95-100	90-100	75-95	55-75	25-35	5-10
Luhon	6-29	Loam------------	CL-ML, ML	A-4	0	95-100	90-100	75-95	55-75	25-35	5-10
	29-46	Cobbly loam------	CL-ML, SM-SC, ML, SM	A-4	20-30	75-85	70-80	60-75	35-60	25-35	5-10
	46-60	Very cobbly sandy loam.	GM	A-1	35-45	50-60	45-55	20-35	15-25	15-20	NP-5
83--------------	0-6	Loam------------	CL-ML, ML	A-4	0	85-100	80-100	70-90	50-65	25-35	5-10
Luhon	6-60	Loam------------	CL-ML, ML	A-4	0	90-100	85-100	75-95	60-75	25-35	5-10
84--------------	0-4	Very cobbly sandy loam.	SM, GM	A-1	30-40	50-70	45-65	25-35	10-20	20-30	NP-5
Luhon	4-25	Gravelly loam----	CL-ML, ML, GM-GC, GM	A-4	5-15	65-80	60-75	50-65	40-60	25-35	5-10
	25-54	Loam------------	CL-ML, ML	A-4	0	90-100	85-100	75-95	60-75	25-35	5-10
	54-60	Sandy loam, gravelly sandy loam.	SM	A-1, A-2	0-10	70-95	65-90	40-60	25-35	20-25	NP-5
85, 86, 87-------	0-6	Loamy fine sand	SM	A-2, A-4	0	100	100	75-90	30-40	---	NP
Mespun	6-60	Fine sand, loamy fine sand, loamy sand.	SM	A-2	0	100	100	70-95	15-35	---	NP
88--------------	0-5	Sandy loam-------	SM	A-4	0	100	100	60-70	35-45	20-30	NP-5
Mikim	5-60	Loam, clay loam	CL	A-6	0	100	100	80-100	60-80	30-40	10-20
89--------------	0-3	Loam------------	CL-ML	A-4	0	100	100	85-95	60-70	25-35	5-10
Mikim	3-60	Loam------------	CL-ML	A-4	0	100	100	80-95	60-75	25-35	5-10
90--------------	0-5	Loam------------	CL-ML	A-4	0	100	100	85-90	60-75	20-25	5-10
Mikim	5-60	Loam, clay loam	CL	A-6	0	100	100	80-100	60-80	30-40	10-20
91, 92-----------	0-4	Clay loam--------	CL	A-6	0	100	100	80-100	70-80	30-40	10-15
Mikim	4-60	Clay loam, sandy clay loam.	CL	A-6	0	100	100	80-100	50-75	30-40	10-15
93--------------	0-4	Silt loam--------	CL-ML	A-4	0	100	100	90-100	75-85	20-30	5-10
Mitch	4-60	Stratified silt loam to very fine sandy loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-85	25-35	5-15
94*:											
Mitch-----------	0-4	Silt loam--------	CL-ML	A-4	0	100	100	90-100	75-85	20-30	5-10
	4-60	Stratified silt loam to very fine sandy loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-85	25-35	5-15
Riverwash.											
95--------------	0-4	Fine sandy loam	SM, SM-SC, CL-ML, ML	A-2, A-4	0	90-100	90-100	55-85	30-55	20-30	NP-10
Mivida	4-60	Fine sandy loam	SM, SM-SC, CL-ML, ML	A-2, A-4	0	90-100	90-100	55-85	30-55	20-30	NP-10

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
96--------------- Neto	0-2	Fine sandy loam	SM, ML	A-2, A-4	0	75-100	70-100	60-95	30-55	15-25	NP-5
	2-38	Stratified sandy loam to loamy sand.	SM	A-2	0	90-100	85-95	55-65	25-35	15-25	NP-5
	38-60	Extremely gravelly loamy sand.	GP-GM	A-1	0	20-30	15-25	10-20	5-10	---	NP
97--------------- Neto	0-9	Very fine sandy loam.	CL-ML, ML	A-4	0	100	100	85-95	50-65	25-35	NP-10
	9-35	Very fine sandy loam, fine sandy loam.	CL-ML, SM-SC, ML, SM	A-4	0	100	100	70-90	40-60	25-35	NP-10
	35-60	Silt loam--------	CL-ML, ML	A-4	0	100	100	90-100	75-90	25-35	NP-10
98, 99----------- Notter	0-5	Loam---------------	CL-ML	A-4	0-5	90-100	85-95	70-85	50-65	20-30	5-10
	5-14	Gravelly sandy clay loam, gravelly loam, gravelly clay loam.	GM-GC, SM-SC, CL-ML, CL	A-2, A-4, A-6	0-10	65-85	60-80	40-70	25-60	25-35	5-15
	14-29	Very gravelly sandy loam, very gravelly sand, gravelly sandy loam.	GM, SM	A-1	0-5	35-65	30-60	15-40	10-25	20-25	NP-5
	29-60	Stratified very gravelly sandy loam to very gravelly sand.	GM	A-1	0-5	35-55	30-50	15-35	10-20	---	NP
100-------------- Notter	0-11	Loam-------------	CL-ML, CL	A-4, A-6	0	85-95	80-90	65-85	50-75	25-35	5-15
	11-35	Clay loam--------	CL	A-6	0	85-95	80-90	75-85	60-75	30-40	10-20
	35-60	Very gravelly loam.	GM-GC	A-2	15-30	40-50	35-50	30-50	25-35	20-30	5-10
101-------------- Notter	0-3	Gravelly coarse sandy loam.	SM	A-1, A-2	0-5	65-75	60-70	30-45	15-30	20-25	NP-5
	3-22	Gravelly sandy clay loam, gravelly loam, gravelly clay loam.	GM-GC, SM-SC, CL-ML, CL	A-2, A-4, A-6	0-10	65-85	60-80	40-70	25-60	25-35	5-15
	22-37	Very gravelly sandy loam, very gravelly sand, gravelly sandy loam.	GM, SM	A-1	0-5	35-65	30-60	15-40	10-25	20-25	NP-5
	37-60	Stratified very gravelly sandy loam to very gravelly sand.	GM	A-1	0-5	35-55	30-50	15-35	10-20	---	NP

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
102-------------- Notter	0-5	Gravelly loam----	SM-SC, GM-GC	A-4	0-5	65-75	60-70	50-60	35-50	20-30	5-10
	5-14	Gravelly sandy clay loam, gravelly loam, gravelly clay loam.	GM-GC, SM-SC, CL-ML, CL	A-2, A-4, A-6	0-10	65-85	60-80	40-70	25-60	25-35	5-15
	14-29	Very gravelly sandy loam, very gravelly sand, gravelly sandy loam.	GM, SM	A-1	0-5	35-65	30-60	15-40	10-25	20-25	NP-5
	29-60	Stratified very gravelly sandy loam to very gravelly sand.	GM	A-1	0-5	35-55	30-50	15-35	10-20	---	NP
103-------------- Notter	0-3	Very cobbly loam	GM-GC	A-2	35-45	45-55	40-50	30-40	25-30	20-30	5-10
	3-15	Gravelly sandy clay loam, gravelly loam, gravelly clay loam.	CL, SC, GC	A-2, A-6	0-10	65-85	60-80	40-70	25-60	25-35	10-20
	15-60	Stratified very gravelly silt loam to very gravelly sand.	GP-GM, GM	A-1	0-5	35-55	30-50	15-35	5-15	---	NP
104-------------- Notter Variant	0-8	Loam-------------	CL-ML	A-4	0	100	100	85-95	60-75	25-30	5-10
	8-24	Clay loam, loam	CL-ML, CL	A-4, A-6	0	90-100	85-100	80-100	65-80	25-35	5-15
	24-60	Extremely cobbly sand, extremely gravelly loamy sand.	GP, GP-GM	A-1	25-45	30-45	25-40	15-30	0-10	---	NP
105*:											
Pahreah---------	0-1	Gravelly loam	GM-GC	A-2	0	35-45	30-40	25-40	20-30	25-35	5-10
	1-12	Very gravelly loam, very gravelly clay loam.	GM-GC	A-2	0	40-50	35-45	30-40	25-35	25-35	5-10
	12-26	Extremely gravelly loam, extremely gravelly silt loam.	GP-GM, GM-GC	A-2	0	15-25	10-20	5-20	5-20	25-35	5-10
	26-38	Extremely cobbly loam, extremely cobbly silt loam.	GM-GC	A-2	55-70	25-35	20-30	15-30	10-25	25-35	5-10
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sheege----------	0-8	Very gravelly sandy loam.	GM	A-1	5-15	35-45	30-40	20-30	10-20	15-25	NP-5
	8-19	Very cobbly loam, very cobbly silt loam.	GM-GC, GC, SM-SC, SC	A-4, A-6	20-30	65-75	55-65	50-65	35-50	25-35	5-15
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
106*:											
Pahreah	0-1	Very gravelly loam.	GM-GC	A-2	0	35-45	30-40	25-40	20-30	25-35	5-10
	1-12	Very gravelly loam, very gravelly clay loam.	GM-GC	A-2	0	40-50	35-45	30-40	25-35	25-35	5-10
	12-26	Extremely gravelly loam, extremely gravelly silt loam.	GP-GM, GM-GC	A-2	0	15-25	10-20	5-20	5-20	25-35	5-10
	26-38	Extremely cobbly loam, extremely cobbly silt loam.	GM-GC	A-2	55-70	25-35	20-30	15-30	10-25	25-35	5-10
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sielo	0-9	Very fine sandy loam.	CL-ML	A-4	0	100	100	90-95	60-70	20-30	5-10
	9-60	Clay, silty clay, silty clay loam.	CL	A-6, A-7	0	85-100	80-100	75-95	70-90	35-50	15-30
107*:											
Pahreah	0-1	Very gravelly loam.	GM-GC	A-2	0	35-45	30-40	25-40	20-30	25-35	5-10
	1-12	Very gravelly loam, very gravelly clay loam.	GM-GC	A-2	0	40-50	35-45	30-40	25-35	25-35	5-10
	12-26	Extremely gravelly loam, extremely gravelly silt loam.	GP-GM, GM-GC	A-2	0	15-25	10-20	5-20	5-20	25-35	5-10
	26-38	Extremely cobbly loam, extremely cobbly silt loam.	GM-GC	A-2	55-70	25-35	20-30	15-30	10-25	25-35	5-10
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Swapps	0-3	Gravelly loam	SM-SC, CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	3-8	Gravelly loam, gravelly clay loam, cobbly clay loam.	GC, SC	A-6	0-30	60-75	55-70	45-60	40-50	30-40	10-20
	8-23	Very gravelly loam, very gravelly clay loam, very cobbly loam.	GM-GC, GC	A-2	5-45	40-50	30-45	20-35	15-30	20-35	5-15
	23	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
108*:											
Panguitch-------	0-5	Gravelly sandy loam.	SM	A-1, A-2	0	65-75	60-70	40-50	20-30	15-25	NP-5
	5-11	Gravelly clay loam.	GC, CL	A-6	0	65-75	60-70	55-65	45-55	30-40	10-15
	11-47	Gravelly sandy loam.	GM-GC, GM, SM-SC, SM	A-1, A-2	5-10	60-75	55-70	40-50	20-35	15-30	NP-10
	47-60	Gravelly loamy sand, very gravelly loamy sand, gravelly loam.	GM-GC, GM, SM-SC, SM	A-1, A-2, A-4	15-20	50-75	45-70	25-60	10-40	15-30	NP-10
Mitch-----------	0-4	Silt loam--------	CL-ML	A-4	0	100	100	90-100	75-85	20-30	5-10
	4-60	Stratified silt loam to very fine sandy loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-85	25-35	5-15
109*:											
Panguitch-------	0-5	Gravelly loam----	GM-GC, GC	A-4, A-6	0	65-75	60-70	50-60	40-50	25-35	5-15
	5-11	Gravelly clay loam.	GC, CL	A-6	0	65-75	60-70	55-65	45-55	30-40	10-15
	11-47	Gravelly sandy loam.	GM-GC, GM, SM-SC, SM	A-1, A-2	5-10	60-75	55-70	40-50	20-35	15-30	NP-10
	47-60	Gravelly loamy sand, very gravelly loamy sand, gravelly loam.	GM-GC, GM, SM-SC, SM	A-1, A-2, A-4	15-20	50-75	45-70	25-60	10-40	15-30	NP-10
Riverwash.											
110-------------- Paunsaugunt	0-3	Gravelly loam----	GM-GC	A-4	0-5	50-65	50-65	45-55	40-50	20-30	5-10
	3-15	Very cobbly loam, very cobbly sandy loam.	SM, SM-SC	A-1, A-2, A-4	35-60	75-85	70-80	40-60	20-50	15-25	NP-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
111*:											
Paunsaugunt-----	0-3	Gravelly loam----	GM-GC	A-4	0-5	50-65	50-65	45-55	40-50	20-30	5-10
	3-15	Very cobbly loam, very cobbly sandy loam.	SM, SM-SC	A-1, A-2, A-4	35-60	75-85	70-80	40-60	20-50	15-25	NP-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Syrett----------	0-1	Gravelly loam----	GM-GC, GC	A-4, A-6	0-10	55-65	50-65	40-50	35-40	25-35	5-15
	1-38	Very gravelly loam, very gravelly silt loam, very cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	15-45	35-55	30-50	25-45	20-40	25-35	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
112*. Playas											

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
113---------------	0-33	Sandy loam--------	SM-SC	A-2, A-4	0	95-100	90-100	60-70	30-40	20-30	5-10
Plite	33-60	Sandy loam--------	SM-SC	A-2, A-4	0	95-100	90-100	60-70	30-40	20-30	5-10
114---------------	0-6	Loamy sand--------	SM	A-2	0	100	100	50-75	15-30	---	NP
Podo	6-19	Gravelly sandy loam, cobbly sandy loam, gravelly sandy clay loam.	SM-SC, SC, GM-GC, GC	A-2, A-4, A-6	0-30	50-95	50-90	35-70	25-40	20-35	NP-15
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
115*:											
Podo------------	0-2	Very gravelly loam.	GM-GC	A-2, A-4	10-15	45-55	40-50	35-50	25-40	25-35	5-10
	2-13	Gravelly loam, gravelly clay loam.	GC	A-4, A-6	0	55-65	50-60	40-60	35-50	30-40	5-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Wiggler----------	0-4	Channery clay loam.	GC	A-6	0	55-65	50-60	45-60	35-50	30-35	10-15
	4-18	Loam, clay loam	CL-ML, CL	A-4, A-6	0	90-100	85-100	75-100	60-80	25-35	5-15
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
116*:											
Podo------------	0-4	Channery sandy loam.	SM, GM	A-1	0-10	60-70	55-65	30-40	15-25	---	NP
	4-16	Gravelly sandy loam, cobbly sandy loam, gravelly sandy clay loam.	SM-SC	A-2, A-4	10-30	75-85	70-80	50-70	30-40	25-35	5-10
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
117---------------	0-4	Very cobbly loam	GM-GC, GC	A-2	40-50	40-50	35-45	30-40	25-35	25-35	5-15
Quilt	4-43	Cobbly clay, cobbly clay loam, gravelly clay loam.	CL	A-6, A-7	15-25	70-80	65-75	60-70	55-65	35-50	15-25
	43-60	Gravelly sandy clay loam, gravelly coarse sandy loam, cobbly sandy clay loam.	SM-SC, SC	A-2	10-30	65-80	60-75	35-50	20-30	20-35	5-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
118--------------	0-5	Very cobbly loam	GM-GC, GC	A-2	40-50	40-50	35-45	30-40	25-35	25-35	5-15
Quilt	5-42	Cobbly clay, cobbly clay loam, gravelly clay loam.	CL	A-6, A-7	15-25	70-80	65-75	60-70	55-65	35-50	15-25
	42-60	Gravelly sandy clay loam, gravelly coarse sandy loam, cobbly sandy clay loam.	SM-SC, SC	A-2	10-30	65-80	60-75	35-50	20-30	20-35	5-15
119-------------- Redcreek	0-8	Gravelly sandy loam.	SM, SM-SC	A-1, A-2	0-10	65-80	60-75	35-50	20-30	20-30	NP-10
	8-19	Gravelly sandy loam.	SM, SM-SC	A-1, A-2	5-15	70-80	65-75	35-50	15-35	20-30	NP-10
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
120--------------	0-8	Cobbly loam------	SM-SC, SC	A-4, A-6	25-35	75-85	70-80	60-75	35-50	25-35	5-15
Redcreek	8-19	Gravelly sandy loam.	SM, SM-SC	A-1, A-2	5-15	70-80	65-75	35-50	15-35	20-30	NP-10
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
121*. Riverwash											
122*. Rock outcrop											
123*: Rock outcrop.											
Podo------------	0-4	Channery sandy loam.	SM, GM	A-1	0-10	60-70	55-65	30-40	15-25	---	NP
	4-16	Gravelly sandy loam, cobbly sandy loam, gravelly sandy clay loam.	SM-SC	A-2, A-4	10-30	75-85	70-80	50-70	30-40	25-35	5-10
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
124*. Rubble land											
125--------------	0-4	Clay loam--------	CL	A-6	0	100	100	90-100	80-90	30-40	10-20
Ruko	4-15	Clay, clay loam, silty clay.	CL	A-6, A-7	0	100	100	90-100	80-90	35-50	15-25
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
126*: Ruko------------	0-4	Clay loam--------	CL	A-6	0	100	100	90-100	80-90	30-40	10-20
	4-19	Clay, clay loam, silty clay.	CL	A-6, A-7	0	100	100	90-100	80-90	35-50	15-25
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
126*:											
Podo------------	0-6	Gravelly sandy loam	SM, GM	A-1	0-10	60-70	55-65	30-40	15-25	---	NP
	6-19	Gravelly sandy loam, cobbly sandy loam, gravelly sandy clay loam.	SM-SC	A-2, A-4	10-30	75-85	70-80	50-70	30-40	25-35	5-10
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
127, 128--------- Schauson	0-5	Loam------------	CL-ML	A-4	0	90-100	85-100	75-95	55-75	25-35	5-10
	5-25	Sandy clay loam, clay loam.	CL	A-6	0	95-100	90-100	75-95	50-75	30-40	10-15
	25-60	Sandy clay loam, clay loam.	CL, ML	A-4, A-6	0	95-100	90-100	75-95	50-75	30-40	5-15
129*:											
Sevier----------	0-4	Very fine sandy loam.	ML	A-4	0	100	100	85-95	50-65	15-25	NP-5
	4-24	Clay loam, clay, silty clay.	CL, CH	A-6, A-7	0	75-100	75-100	70-100	65-90	30-70	10-45
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Skutum----------	0-17	Fine sandy loam	SM, ML	A-2, A-4	0	75-100	70-100	60-95	30-55	15-25	NP-5
	17-36	Gravelly clay loam, gravelly clay, gravelly sandy clay loam.	GC	A-7	0-5	55-75	50-70	45-65	35-50	40-55	20-35
	36-50	Gravelly sandy loam.	GM-GC, SM-SC	A-2	5-20	60-75	55-75	35-50	20-35	20-30	5-10
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---
130*:											
Sheege----------	0-2	Gravelly sandy loam.	SM	A-2, A-1	0-10	60-70	50-65	30-40	15-30	15-25	NP-5
	2-19	Very cobbly loam, very cobbly silt loam.	GM-GC, GC, SM-SC, SC	A-4, A-6	20-30	65-75	55-65	50-65	35-50	25-35	5-15
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Swapps----------	0-3	Gravelly loam----	SM-SC, CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	3-15	Gravelly loam, gravelly clay loam, cobbly clay loam.	GC, SC	A-6	0-30	60-75	55-70	45-60	40-50	30-40	10-20
	15-23	Very gravelly loam, very gravelly clay loam, very cobbly loam.	GM-GC, GC	A-2	5-45	40-50	30-45	20-35	15-30	20-35	5-15
	23	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
131*:											
Showalter	0-10	Cobbly loam	SM-SC, SC	A-4, A-6	25-35	75-85	70-80	60-75	40-50	25-35	5-15
	10-30	Very gravelly clay loam, very gravelly clay, very cobbly clay.	GC	A-6, A-7	15-35	55-70	50-65	45-60	35-50	35-50	15-25
	30-60	Very gravelly sandy clay loam, gravelly loam, cobbly loam.	GM-GC, GC, SC, SM-SC	A-4, A-6, A-2	15-30	45-75	40-75	35-65	25-50	25-35	5-15
Guben	0-10	Gravelly loam	GM-GC	A-4	0-5	55-65	50-60	40-55	35-45	20-30	5-10
	10-14	Very gravelly sandy clay loam, very gravelly clay loam, gravelly loam.	GM-GC, GC	A-2, A-4, A-6	5-15	35-65	30-60	25-45	15-40	25-40	5-20
	14-60	Extremely gravelly sandy clay loam, very gravelly loam, extremely gravelly sandy loam.	GM-GC, GC	A-2	15-30	30-40	25-35	15-30	10-25	25-35	5-15
	60-90	Very cobbly sandy loam.	GM-GC, GC	A-2	30-45	45-65	40-60	30-50	10-35	25-30	5-10
132	0-10	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
Shupert	10-42	Clay loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-80	30-40	10-15
	42-60	Loam	CL-ML	A-4	0	100	100	85-95	60-75	25-35	5-10
133	0-9	Very fine sandy loam.	CL-ML	A-4	0	100	100	90-95	60-70	20-30	5-10
Sielo	9-60	Clay, silty clay, silty clay loam.	CL	A-6, A-7	0	85-100	80-100	75-95	70-90	35-50	15-30
134	0-17	Very fine sandy loam.	CL-ML, CL	A-4, A-6	0	100	100	85-95	75-95	20-35	5-15
Skutum	17-36	Gravelly clay loam, gravelly clay, gravelly sandy clay loam.	GC	A-7	0-5	55-75	50-70	45-65	35-50	40-55	20-35
	36-50	Gravelly sandy loam.	GM-GC, SM-SC	A-2	5-20	60-75	55-75	35-50	20-35	20-30	5-10
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---
135	0-17	Fine sandy loam	SM, ML	A-2, A-4	0	75-100	70-100	60-95	30-55	15-25	NP-5
Skutum	17-36	Gravelly clay loam, gravelly clay, gravelly sandy clay loam.	GC	A-7	0-5	55-75	50-70	45-65	35-50	40-55	20-35
	36-50	Gravelly sandy loam.	GM-GC, SM-SC	A-2	5-20	60-75	55-75	35-50	20-35	20-30	5-10
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
136-------------- Swapps	0-3	Gravelly loam----	SM-SC, CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	3-8	Gravelly loam, gravelly clay loam, cobbly clay loam.	GC, SC	A-6	0-30	60-75	55-70	45-60	40-50	30-40	10-20
	8-36	Very gravelly loam, very gravelly clay loam, very cobbly loam.	GM-GC, GC	A-2	5-45	40-50	30-45	20-35	15-30	20-35	5-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
137-------------- Swapps	0-9	Gravelly loam----	SM-SC, CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	9-20	Gravelly loam, gravelly clay loam, cobbly clay loam.	GC, SC	A-6	0-30	60-75	55-70	45-60	40-50	30-40	10-20
	20-36	Very gravelly loam, very gravelly clay loam, very cobbly loam.	GM-GC, GC	A-2	5-45	40-50	30-45	20-35	15-30	20-35	5-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
138-------------- Syrett	0-1	Gravelly loam----	GM-GC, GC	A-4, A-6	0-10	55-65	50-65	40-50	35-40	25-35	5-15
	1-38	Very gravelly loam, very gravelly silt loam, very cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	15-45	35-55	30-50	25-45	20-40	25-35	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
139*:											
Syrett----------	0-1	Gravelly loam----	GM-GC, GC	A-4, A-6	0-10	55-65	50-65	40-50	35-40	25-35	5-15
	1-38	Very gravelly loam, very gravelly silt loam, very cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	15-45	35-55	30-50	25-45	20-40	25-35	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Frandsen--------	0-2	Loam-------------	CL-ML	A-4	0-5	90-100	85-100	70-95	55-75	25-30	5-10
	2-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	70-95	55-80	25-40	5-15

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

ame and ymbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
----------	0-1	Gravelly loam----	GM-GC, GC	A-4, A-6	0-10	55-65	50-65	40-50	35-40	25-35	5-15
	1-38	Very gravelly loam, very gravelly silt loam, very cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	15-45	35-55	30-50	25-45	20-40	25-35	5-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
----------	0-2	Gravelly loam----	GM-GC, SM-SC	A-4	0	55-75	50-70	40-60	35-50	20-30	5-10
	2-14	Gravelly clay loam, gravelly loam, very gravelly loam.	GM-GC, GC	A-2, A-4, A-6	10-15	45-60	40-60	35-50	25-40	25-35	5-15
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
----------	0-5	Sandy loam-------	SM	A-2, A-4	0	100	100	60-70	30-40	20-25	NP-5
	5-60	Stratified loamy sand to loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0	90-100	85-100	65-95	30-65	20-30	NP-10
----------	0-8	Loam-------------	ML	A-4	0	100	100	85-95	60-75	20-25	NP-5
	8-60	Stratified loamy sand to loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0	90-100	85-100	65-95	30-65	20-30	NP-10
----------	0-5	Loam-------------	ML	A-4	0	100	100	85-95	60-75	20-25	NP-5
	5-60	Stratified loamy sand to loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0	90-100	85-100	65-95	30-65	20-30	NP-10
----------	0-12	Very cobbly silt loam.	CL-ML	A-4	55-65	75-90	70-85	65-85	50-70	25-35	5-10
	12-16	Very cobbly loam, very cobbly clay loam.	GM-GC, GC	A-4, A-6	45-60	55-65	50-60	45-55	35-50	20-30	5-15
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
----------	0-3	Very cobbly loam	GM-GC, SC, SM-SC	A-4	25-35	65-85	60-75	50-70	35-50	25-35	5-10
	3-17	Very cobbly loam, very cobbly clay loam.	GM-GC, GC	A-4, A-6	45-60	55-65	50-60	45-55	35-50	20-30	5-15
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
crop.											
----------	0-8	Loam-------------	CL-ML	A-4	0	80-90	75-85	65-75	55-65	20-30	5-10
	8-60	Very cobbly loam, very gravelly sandy loam, very stony sandy loam.	GM, GM-GC	A-1, A-2	50-60	45-55	40-50	30-40	15-30	15-30	NP-10

ootnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
147--------------- Tridell	0-14	Gravelly loam----	SM-SC, CL-ML	A-4	5-15	75-85	70-80	60-75	40-60	20-30	5-10
	14-60	Extremely cobbly loam, extremely gravelly sandy loam, extremely stony sandy loam.	GM, GM-GC	A-1, A-2	55-60	45-55	40-50	30-40	15-30	15-30	NP-10
148--------------- Tridell	0-8	Cobbly loam------	CL-ML	A-4	20-30	75-95	70-90	60-80	50-60	20-30	5-10
	8-27	Extremely cobbly loam, extremely gravelly sandy loam, extremely stony sandy loam.	GM, GM-GC	A-1, A-2	55-60	45-55	40-50	30-40	15-30	15-30	NP-10
	27-41	Very gravelly sand, extremely gravelly sand, extremely cobbly sand.	GP	A-1	30-45	35-45	30-40	20-30	0-5	---	NP
	41-60	Cobbly loam, cobbly sandy loam, gravelly loam.	SM-SC	A-4, A-2	0-20	80-90	75-85	60-75	25-50	20-30	5-10
149*:											
Tridell----------	0-7	Very cobbly loam	GM-GC	A-2, A-4	30-45	50-60	45-55	35-50	25-40	20-30	5-10
	7-60	Very stony loam	ML, CL-ML	A-4	35-70	65-95	60-90	55-75	50-65	15-25	NP-10
Rock outcrop.											
150--------------- Ustic Torrifluvents	0-11	Sandy loam-------	SM	A-2, A-4	0	95-100	90-100	60-70	30-40	20-25	NP-5
	11-60	Extremely gravelly coarse sandy loam, very gravelly sandy loam.	GP-GM	A-1	10-20	20-35	15-30	10-25	5-15	20-30	NP-5
151--------------- Venture	0-6	Cobbly loam------	CL-ML	A-4	20-30	75-85	70-80	65-75	50-60	20-30	5-10
	6-15	Very gravelly clay loam, very cobbly clay loam.	GC	A-2, A-6	20-45	45-65	40-60	35-55	30-50	30-40	10-20
	15	Indurated--------	---	---	---	---	---	---	---	---	---
152--------------- Venture	0-6	Very cobbly silt loam.	GM-GC	A-4	40-50	50-60	45-55	40-50	35-45	20-30	5-10
	6-15	Very gravelly clay loam, very cobbly clay loam.	GC	A-2, A-6	20-45	45-65	40-60	35-55	30-50	30-40	10-20
	15	Indurated--------	---	---	---	---	---	---	---	---	---
153--------------- Venture	0-4	Cobbly loam------	CL-ML	A-4	20-30	75-85	70-80	65-75	50-60	20-30	5-10
	4-19	Very gravelly clay loam, very cobbly clay loam.	GC	A-2, A-6	20-45	45-65	40-60	35-55	30-50	30-40	10-20
	19	Indurated--------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
154----------------	0-11	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
Villy Family	11-60	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
155, 156----------- Waltershow	0-3	Extremely cobbly loam.	GM-GC	A-2	45-55	35-45	30-40	25-40	20-35	25-35	5-10
	3-20	Very cobbly clay, very cobbly clay loam.	GC	A-6, A-7	45-55	50-60	45-55	35-50	35-50	35-50	15-25
	20-39	Extremely gravelly sandy loam, very gravelly sandy loam.	GM	A-1	30-45	35-55	30-50	15-35	10-20	---	NP
	39-60	Extremely gravelly sand.	GP, GP-GM	A-1	30-40	20-35	15-30	10-20	0-5	---	NP
157*:											
Waltershow-------	0-3	Extremely cobbly loam.	GM-GC	A-2	45-55	35-45	30-40	25-40	20-35	25-35	5-10
	3-20	Very cobbly clay, very cobbly clay loam.	GC	A-6, A-7	45-55	50-60	45-55	35-50	35-50	35-50	15-25
	20-39	Extremely gravelly sandy loam, very gravelly sandy loam.	GM	A-1	30-45	35-55	30-50	15-35	10-20	---	NP
	39-60	Extremely gravelly sand.	GP, GP-GM	A-1	30-40	20-35	15-30	10-20	0-5	---	NP
Venture----------	0-6	Cobbly loam-------	CL-ML	A-4	20-30	75-85	70-80	65-75	50-60	20-30	5-10
	6-15	Very gravelly clay loam, very cobbly clay loam.	GC	A-2, A-6	20-45	45-65	40-60	35-55	30-50	30-40	10-20
	15	Indurated---------	---	---	---	---	---	---	---	---	---
Rock outcrop.											
158---------------- Whiteman	0-2	Very cobbly very fine sandy loam.	SM-SC	A-4	50-60	75-85	70-80	60-75	35-50	20-30	5-10
	2-11	Very cobbly clay loam, very cobbly silty clay loam, very cobbly sandy clay loam.	CL	A-6	50-60	75-85	70-80	65-75	55-70	30-40	10-20
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
159*:											
Whiteman---------	0-2	Very cobbly fine sandy loam.	SM-SC	A-4	50-60	75-85	70-80	60-75	35-50	20-30	5-10
	2-15	Very cobbly clay loam, very cobbly silty clay loam, very cobbly sandy clay loam.	CL	A-6	50-60	75-85	70-80	65-75	55-70	30-40	10-20
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
159*:											
Skutum----------	0-17	Fine sandy loam	SM, ML	A-2, A-4	0	75-100	70-100	60-95	30-55	15-25	NP-5
	17-36	Gravelly clay loam, gravelly clay, gravelly sandy clay loam.	GC	A-7	0-5	55-75	50-70	45-65	35-50	40-55	20-35
	36-50	Gravelly sandy loam.	GM-GC, SM-SC	A-2	5-20	60-75	55-75	35-50	20-35	20-30	5-10
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---
160--------------- Widtsoe	0-8	Gravelly sandy loam.	GM-GC, SM-SC	A-2	5-10	60-90	55-65	35-45	20-30	20-30	5-10
	8-19	Very gravelly clay loam, very gravelly loam, very cobbly clay loam.	GC	A-2, A-6	5-40	40-60	35-55	30-50	25-45	30-40	10-15
	19-60	Extremely cobbly sandy loam, very cobbly loamy sand, very gravelly loam.	GM-GC, GM	A-2, A-1	30-50	40-60	35-55	25-45	10-35	20-30	NP-10
161-------------- Wiggler	0-4	Channery loam----	GM-GC, SM-SC	A-4	0	70-80	65-75	50-65	40-50	25-30	5-10
	4-18	Loam, clay loam	CL-ML, CL	A-4, A-6	0	90-100	85-100	75-100	60-80	25-35	5-15
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
162*:											
Wiggler---------	0-7	Very cobbly loam	GM-GC	A-4	0	60-70	55-65	45-55	35-45	25-30	5-10
	7-19	Loam, clay loam	CL-ML, CL	A-4, A-6	0	90-100	85-100	75-100	60-80	25-35	5-15
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---
Guben-----------	0-8	Very gravelly loam.	GM-GC, GM	A-1, A-2	0-5	30-50	25-45	15-40	10-35	15-30	NP-10
	8-60	Extremely gravelly sandy clay loam, very gravelly loam, extremely gravelly sandy loam.	GM-GC, GC	A-2	15-30	30-40	25-35	15-30	10-25	25-35	5-15
163*:											
Wiggler---------	0-12	Channery clay loam.	GC	A-6	0	55-65	50-60	45-60	35-50	30-35	10-15
	12	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Podo------------	0-5	Very gravelly loam.	GM-GC	A-2, A-4	10-15	45-55	40-50	35-50	25-40	25-35	5-10
	5-13	Gravelly loam, gravelly clay loam.	GC	A-4, A-6	0	55-65	50-60	40-60	35-50	30-40	5-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

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165*:
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166------
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167, 168-
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Zinzer

172-----
Zyme

See

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

me and mbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
---------	0-4	Gravelly sandy loam.	SM-SC, SM, GM, GM-GC	A-2, A-4	0	65-75	60-70	50-60	30-45	20-30	NP-10
	4-24	Gravelly sandy loam, sandy loam, gravelly loamy sand.	SM	A-2, A-1	0	70-100	60-90	35-65	15-35	15-25	NP-5
	24-60	Very gravelly sandy loam.	GM, SM, GP-GM, SP-SM	A-1	0-5	35-60	25-40	10-30	5-15	---	NP
ca------	0-16	Gravelly loam----	CL-ML	A-4	0	75-85	65-75	60-75	40-60	20-30	5-10
	16-60	Very cobbly clay loam, very cobbly clay, extremely cobbly clay loam.	CL	A-6, A-7	45-70	90-100	85-95	80-90	75-80	30-50	10-25
---------	0-9	Gravelly loam----	GM, SM	A-4, A-2	0	65-75	60-70	50-65	30-40	20-25	NP-5
	9-19	Very cobbly sandy clay loam, very gravelly sandy clay loam, very gravelly loam.	GC, SC	A-2, A-6	15-50	55-80	50-75	50-70	30-50	30-40	10-20
	19-60	Very gravelly sandy loam, extremely cobbly sandy loam, very gravelly loam.	SM, GM, GM-GC, SM-SC	A-1, A-2	25-60	55-75	40-60	35-50	15-35	20-30	NP-10
---------	0-7	Loam-------------	CL-ML, ML	A-4	0	100	100	85-95	60-75	20-30	NP-10
	7-60	Loam, fine sandy loam.	CL-ML	A-4	0	100	100	85-95	50-75	25-30	5-10
---------	0-10	Sandy loam-------	SM-SC, SM	A-2	0	100	100	60-70	25-35	20-30	NP-10
	10-60	Fine sandy loam, sandy loam.	SM-SC, CL-ML, SM, ML	A-4	0	100	100	70-85	40-60	20-30	NP-10
---------	0-2	Loam-------------	CL-ML, ML	A-4	0	95-100	90-100	75-95	55-75	20-30	NP-10
	2-23	Clay loam--------	CL	A-6, A-7	0	95-100	90-100	80-100	65-80	35-45	15-25
	23-60	Clay loam, loam	CL	A-6, A-7	0	90-100	85-100	75-95	55-75	30-45	10-25
---------	0-5	Very cobbly loam	GM-GC	A-2, A-4	30-40	60-70	55-65	45-55	30-45	25-35	5-10
	5-20	Very gravelly clay loam, gravelly clay loam.	GC, GM	A-6, A-7	10-20	55-75	50-70	50-70	35-50	35-45	10-20
	20-30	Very cobbly loam	GM-GC	A-2, A-4	35-45	50-60	45-55	40-55	30-45	25-35	5-10
	30-60	Very gravelly sandy loam.	GM	A-1	25-30	40-50	35-45	20-35	10-20	20-25	NP-5
---------	0-12	Loam-------------	CL-ML	A-4	0	90-100	85-100	80-95	55-75	25-30	5-10
	12-36	Clay loam--------	CL	A-6	0	90-100	85-100	85-100	65-80	30-40	10-15
	36-60	Sandy loam, loam	CL-ML, ML, SM-SC, SM	A-4	0	90-100	85-100	60-90	35-75	20-30	NP-10
---------	0-2	Very cobbly loam	GM-GC	A-4	30-45	55-65	50-60	40-55	35-45	25-35	5-10
	2-18	Clay, clay loam	CL	A-6, A-7	0	100	100	90-100	75-95	35-50	15-25
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---

footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--			
			Unified	AASHTO		4	10	40	200
	In				Pct				
173*:									
Zyme-------------	0-2	Clay-------------	CL	A-6, A-	0	100	100	90-100	75-9
	2-11	Clay, clay loam	CL	A-6, A-	0	100	100	90-100	75-9
	11	Weathered bedrock	---	---	---	---	---	---	---
Lazear-----------	0-3	Gravelly sandy loam.	SM	A-1	5-10	60-70	55-65	30-40	15-2
	3-14	Loam-------------	CL-ML	A-4	0	95-100	90-100	75-90	55-7
	14	Unweathered bedrock.	---	---	---	---	---	---	---
Rock outcrop.									

* See description of the map unit for composition and behavior characteristics of the map u

Liquid limit	Plasticity index
Pct	
35-45	15-25
35-50	15-25
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20-30	NP-5
25-35	5-10
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TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
1*:											
Ahlstrom	0-7	20-25	1.20-1.35	0.6-2.0	0.18-0.20	7.4-8.4	<2	Moderate	0.32	2	4L
	7-14	35-45	1.20-1.35	0.06-0.2	0.17-0.19	7.4-8.4	<2	High	0.37		
	14-60	25-40	1.25-1.45	0.06-0.2	0.17-0.19	7.4-8.4	<2	Moderate	0.37		
Osote	0-9	27-35	1.20-1.25	0.2-0.6	0.17-0.19	7.4-7.8	<2	Moderate	0.24	4	4L
	9-33	25-35	1.15-1.25	0.06-0.2	0.17-0.19	7.4-8.4	<2	Moderate	0.32		
	33-60	15-25	1.30-1.40	0.6-2.0	0.07-0.10	7.9-8.4	<2	Low	0.10		
2, 3 Alldown	0-10	28-35	1.25-1.30	0.2-0.6	0.17-0.18	7.4-9.0	<2	Moderate	0.28	5	4L
	10-60	18-35	1.25-1.30	0.2-0.6	0.15-0.18	7.9-9.0	<2	Moderate	0.37		
4 Alldown	0-4	15-25	1.25-1.35	0.2-0.6	0.17-0.18	7.9-8.4	<4	Moderate	0.32	3	4L
	4-12	12-18	1.40-1.50	2.0-6.0	0.09-0.11	>9.0	4-8	Low	0.24		
	12-49	25-35	1.25-1.40	0.2-0.6	0.13-0.15	>9.0	8-16	Moderate	0.37		
	49-60	25-30	1.25-1.35	0.6-2.0	0.13-0.15	>9.0	4-8	Moderate	0.20		
5 Alldown	0-10	28-35	1.25-1.30	0.2-0.6	0.17-0.18	7.4-9.0	<2	Moderate	0.28	5	4L
	10-60	18-35	1.25-1.30	0.2-0.6	0.15-0.18	7.9-9.0	<2	Moderate	0.37		
6 Andys	0-8	18-25	1.25-1.30	0.6-2.0	0.15-0.17	7.9-8.4	<2	Low	0.28	1	4L
	8-30	12-18	1.25-1.30	2.0-6.0	0.15-0.17	7.9-9.0	<2	Low	0.28		
	30-60	8-18	1.30-1.45	2.0-6.0	0.08-0.12	7.9-9.0	<2	Low	0.17		
7 Andys	0-7	12-18	1.20-1.30	0.6-2.0	0.09-0.10	7.9-8.4	<4	Low	0.10	1	8
	7-36	12-18	1.20-1.30	0.6-2.0	0.11-0.13	8.5-9.0	<4	Low	0.24		
	36-60	12-18	1.20-1.30	0.6-2.0	0.16-0.18	8.5-9.0	<4	Low	0.32		
8*:											
Badland.											
Cannonville	0-7	40-45	1.15-1.25	0.06-0.2	0.17-0.18	7.9-9.0	4-8	High	0.28	1	4
	7	---	---	---	---	---	---	---	---		
Rock outcrop.											
9*:											
Badland.											
Rock outcrop.											
Paunsaugunt	0-3	18-25	1.25-1.30	0.6-2.0	0.12-0.14	7.4-8.4	<2	Low	0.10	1	8
	3-15	10-18	1.35-1.40	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low	0.10		
	15	---	---	---	---	---	---	---	---		
10, 11 Baldfield	0-2	40-50	1.15-1.20	0.06-0.2	0.17-0.18	7.9-9.0	2-8	High	0.32	5	4
	2-60	35-50	1.15-1.20	0.06-0.2	0.17-0.18	7.9-9.0	2-8	High	0.32		
12 Barx	0-5	10-20	1.25-1.35	0.6-6.0	0.12-0.16	7.4-8.4	<2	Low	0.43	5	3
	5-12	22-35	1.25-1.40	0.6-2.0	0.16-0.19	7.4-9.0	<2	Moderate	0.24		
	12-60	16-30	1.25-1.40	0.6-2.0	0.11-0.18	7.9-9.0	<2	Moderate	0.28		
13 Bayfield	0-3	40-50	1.15-1.25	0.06-0.2	0.17-0.18	7.9-8.4	<4	High	0.24	5	4
	3-60	40-50	1.15-1.25	0.06-0.2	0.17-0.18	7.9-9.0	<4	High	0.28		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
14---------------	0-2	45-55	1.15-1.25	0.06-0.2	0.12-0.16	7.9-9.0	4-8	High--------	0.20	5	4
Befar	2-60	35-55	1.15-1.25	0.06-0.2	0.12-0.16	7.9-9.0	8-16	High--------	0.24		
15---------------	0-17	15-20	1.25-1.35	0.6-2.0	0.16-0.18	5.6-6.5	<2	Low---------	0.20	2	5
Behanin	17-44	15-25	1.25-1.35	0.6-2.0	0.09-0.11	5.6-6.5	<2	Low---------	0.17		
	44-60	5-15	1.30-1.45	2.0-6.0	0.04-0.06	5.6-6.5	<2	Low---------	0.15		
16*--------------	0-5	0-5	1.45-1.50	6.0-20	0.06-0.08	6.6-7.3	<2	Low---------	0.17	5	1
Blanchard Family	5-55	0-5	1.45-1.50	6.0-20	0.06-0.08	6.6-7.3	<2	Low---------	0.17		
	55	---	---	---	---	---	---	------------	----		
17---------------	0-2	18-27	1.25-1.35	0.2-0.6	0.15-0.17	7.9-9.0	2-16	Low---------	0.37	1	4L
Borollic Natrargids	2-15	35-40	1.30-1.50	0.06-0.2	0.16-0.18	>9.0	<2	Moderate----	0.32		
	15-60	25-30	1.25-1.35	0.2-0.6	0.16-0.18	>8.4	<2	Moderate----	0.32		
18---------------	0-6	15-20	1.30-1.45	2.0-6.0	0.06-0.07	7.4-7.8	<2	Low---------	0.17	2	8
Broncho	6-20	7-13	1.30-1.45	2.0-6.0	0.10-0.11	7.4-7.8	<2	Low---------	0.24		
	20-43	2-5	1.45-1.55	>20.0	0.03-0.04	8.5-9.0	<2	Low---------	0.20		
	43-60	5-8	1.45-1.55	6.0-20.0	0.07-0.08	8.5-9.0	<2	Low---------	0.32		
19---------------	0-10	12-18	1.25-1.30	0.6-2.0	0.16-0.17	7.9-8.4	<2	Low---------	0.32	2	4L
Bruman	10-39	8-18	1.25-1.45	2.0-6.0	0.06-0.09	7.9-9.0	<2	Low---------	0.10		
	39-60	1-10	1.45-1.55	6.0-20.0	0.03-0.04	7.9-9.0	<2	Low---------	0.05		
20---------------	0-10	12-18	1.25-1.30	0.6-2.0	0.11-0.14	7.9-8.4	<2	Low---------	0.05	2	8
Bruman	10-31	8-18	1.25-1.45	2.0-6.0	0.06-0.09	7.9-9.0	<2	Low---------	0.10		
	31-60	1-10	1.45-1.55	6.0-20.0	0.03-0.04	7.9-9.0	<2	Low---------	0.05		
21, 22-----------	0-9	8-18	1.25-1.30	0.6-2.0	0.11-0.12	7.9-8.4	<2	Low---------	0.05	2	8
Bruman	9-31	8-18	1.30-1.45	2.0-6.0	0.06-0.08	8.5-9.0	<2	Low---------	0.05		
	31-60	2-4	1.45-1.55	6.0-20.0	0.03-0.05	8.5-9.0	<2	Low---------	0.02		
23, 24-----------	0-8	12-18	1.25-1.30	0.6-2.0	0.09-0.12	7.9-8.4	<2	Low---------	0.05	2	8
Bruman	8-38	8-18	1.35-1.45	2.0-6.0	0.06-0.08	8.5-9.0	<2	Low---------	0.05		
	38-60	1-10	1.45-1.55	6.0-20.0	0.03-0.04	7.9-9.0	<2	Low---------	0.05		
25---------------	0-4	5-15	1.15-1.25	0.6-2.0	0.15-0.17	7.4-7.8	<2	Low---------	0.43	5	3
Brycan	4-60	20-33	1.25-1.30	0.6-2.0	0.17-0.19	7.4-8.4	<2	Moderate----	0.32		
26---------------	0-12	5-15	1.15-1.25	0.6-2.0	0.15-0.17	7.4-7.8	<2	Low---------	0.43	5	3
Brycan	12-37	20-30	1.25-1.30	0.6-2.0	0.17-0.19	7.4-7.8	<2	Moderate----	0.24		
	37-47	8-15	1.30-1.45	2.0-6.0	0.10-0.12	7.4-7.8	<2	Low---------	0.20		
	47-60	20-33	1.25-1.30	0.6-2.0	0.17-0.19	7.4-8.4	<2	Moderate----	0.32		
27---------------	0-11	15-25	1.25-1.30	0.6-2.0	0.08-0.11	5.6-7.8	<2	Low---------	0.15	1	8
Bushvalley	11-19	20-30	1.40-1.50	0.2-0.6	0.04-0.11	5.6-7.8	<2	Moderate----	0.10		
	19	---	---	---	---	---	---	------------	----		
28*:											
Callings--------	0-11	14-18	0.94-0.98	0.6-2.0	0.13-0.15	6.1-7.8	<2	Low---------	0.24	2	5
	11-18	10-15	1.00-1.02	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low---------	0.17		
	18-32	35-45	1.05-1.07	0.06-0.2	0.09-0.11	6.1-7.8	<2	Moderate----	0.15		
	32-60	25-30	1.10-1.15	0.2-0.6	0.07-0.09	6.6-7.8	<2	Low---------	0.15		
Winnemucca------	0-11	18-27	1.20-1.25	0.6-2.0	0.15-0.17	6.1-7.3	<2	Low---------	0.15	2	8
	11-28	35-45	1.15-1.25	0.06-0.2	0.08-0.12	6.1-7.3	<2	Moderate----	0.10		
	28-60	18-27	1.25-1.30	0.6-2.0	0.07-0.10	6.6-7.3	<2	Low---------	0.10		
29---------------	0-7	40-45	1.15-1.25	0.06-0.2	0.17-0.18	7.9-9.0	4-8	High--------	0.28	1	4
Cannonville	7	---	---	---	---	---	---	------------	----		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

name and symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodi-bility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
------------	0-2	40-45	1.15-1.25	0.06-0.2	0.08-0.10	7.9-9.0	4-8	Moderate----	0.05	1	8
ville	2-18	40-50	1.15-1.25	0.06-0.2	0.17-0.18	7.9-9.0	4-8	High--------	0.28		
	18	---	---	---	---	---	---	------------	----		
o---------	0-3	18-20	1.35-1.40	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low---------	0.15	2	8
	3-14	25-30	1.30-1.35	0.2-0.6	0.12-0.14	6.1-7.3	<2	Moderate----	0.24		
	14-38	35-45	1.20-1.25	0.06-0.2	0.08-0.10	6.6-7.3	<2	Moderate----	0.15		
	38	---	---	---	---	---	---	------------	----		
n---------	0-17	15-20	1.25-1.35	0.6-2.0	0.16-0.18	5.6-6.5	<2	Low---------	0.20	2	5
	17-44	15-25	1.25-1.35	0.6-2.0	0.09-0.11	5.6-6.5	<2	Low---------	0.17		
	44-60	5-15	1.30-1.45	2.0-6.0	0.04-0.06	5.6-6.5	<2	Low---------	0.15		
o---------	0-3	18-20	1.35-1.40	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low---------	0.15	2	8
	3-14	25-30	1.30-1.35	0.2-0.6	0.12-0.14	6.1-7.3	<2	Moderate----	0.24		
	14-38	35-45	1.20-1.25	0.06-0.2	0.08-0.10	6.6-7.3	<2	Moderate----	0.15		
	38	---	---	---	---	---	---	------------	----		
Family-----	0-5	20-25	1.20-1.30	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low---------	0.17	1	8
	5-18	35-45	1.25-1.40	0.06-0.2	0.11-0.13	6.6-7.8	<2	High--------	0.20		
	18	---	---	---	---	---	---	------------	----		
o---------	0-8	18-25	1.30-1.40	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low---------	0.20	2	8
	8-38	35-45	1.20-1.25	0.06-0.2	0.08-0.10	6.6-7.3	<2	Moderate----	0.15		
	38	---	---	---	---	---	---	------------	----		
ucca------	0-16	18-27	1.25-1.30	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low---------	0.17	2	8
	16-60	35-45	1.15-1.25	0.06-0.2	0.08-0.12	6.1-7.3	<2	Moderate----	0.10		
eville-----	0-2	15-20	1.25-1.30	0.6-2.0	0.07-0.09	7.4-8.4	<2	Low---------	0.15	2	8
	2-9	23-32	1.25-1.30	0.6-2.0	0.10-0.13	7.4-8.4	<2	Moderate----	0.15		
	9-24	15-20	1.25-1.40	0.6-2.0	0.09-0.11	7.9-9.0	<2	Low---------	0.15		
	24	---	---	---	---	---	---	------------	----		
outcrop.											
------------	0-3	18-27	1.25-1.30	0.6-2.0	0.10-0.13	7.9-8.4	<2	Low---------	0.15	1	8
er	3-10	18-27	1.25-1.30	0.6-2.0	0.10-0.13	7.9-8.4	<2	Low---------	0.20		
	10-60	18-27	1.25-1.30	0.6-2.0	0.08-0.10	7.9-9.0	<2	Low---------	0.10		
------------	0-3	18-27	1.25-1.30	0.6-2.0	0.10-0.13	7.9-8.4	<2	Low---------	0.15	1	8
er	3-10	18-27	1.25-1.30	0.6-2.0	0.10-0.13	7.9-8.4	<2	Low---------	0.20		
	10-60	18-27	1.25-1.30	0.6-2.0	0.08-0.10	7.9-9.0	<2	Low---------	0.10		
------------	0-7	18-25	1.10-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Low---------	0.32	5	4L
y	7-60	18-35	1.10-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Moderate----	0.32		
------------	0-7	18-25	1.10-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Low---------	0.32	5	4L
y	7-60	18-35	1.10-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Moderate----	0.32		
ore--------	0-6	30-35	1.25-1.30	0.6-2.0	0.08-0.10	7.4-7.8	<2	Low---------	0.15	1	8
	6-13	28-35	1.25-1.30	0.6-2.0	0.09-0.10	7.4-7.8	<2	Low---------	0.20		
	13	---	---	---	---	---	---	------------	----		
outcrop.											

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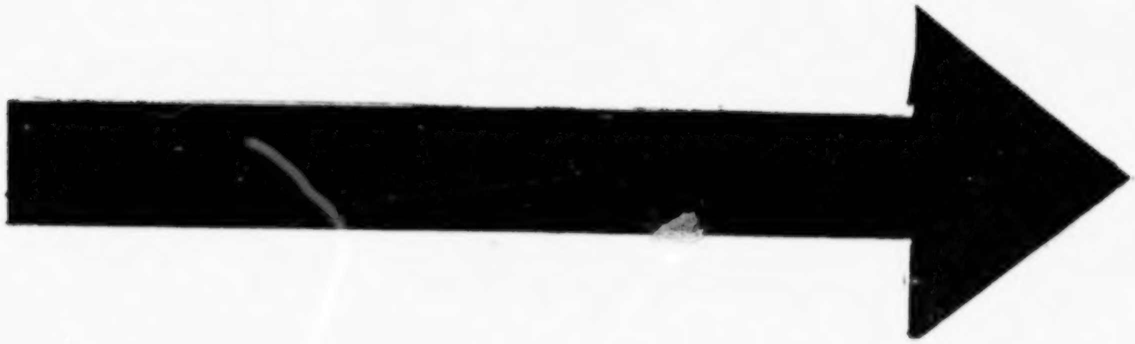

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
40	0-3	8-14	1.30-1.45	2.0-6.0	0.11-0.13	7.4-7.8	<2	Low	0.32	5	3
Crestline	3-60	8-14	1.30-1.45	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low	0.32		
41	0-4	20-27	1.20-1.30	0.6-2.0	0.08-0.09	6.6-7.3	<2	Low	0.10	2	8
Dalcan	4-15	35-45	1.25-1.35	0.06-0.2	0.08-0.13	6.6-7.3	<2	Moderate	0.10		
	15-22	25-35	1.25-1.35	0.2-0.6	0.08-0.09	6.6-7.8	<2	Low	0.10		
	22	---	---	---	---	---	---	------------	----		
42, 43	0-5	15-25	1.15-1.25	0.6-2.0	0.17-0.19	7.9-9.0	<2	Low	0.43	5	4L
Descot	5-60	10-18	1.15-1.25	2.0-6.0	0.13-0.17	7.9-9.0	<2	Low	0.43		
44	0-7	20-24	1.25-1.30	0.6-2.0	0.11-0.13	7.9-8.4	<2	Low	0.24	5	8
Dimyaw Family	7-27	35-40	1.25-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Moderate	0.28		
	27-60	40-45	1.15-1.25	0.06-0.2	0.17-0.18	>8.4	<2	High	0.28		
45	0-5	20-25	1.25-1.30	0.6-2.0	0.14-0.16	5.6-6.5	<2	Moderate	0.28	5	6
Echard	5-25	35-45	1.20-1.25	<0.06	0.13-0.15	5.6-6.5	<2	Moderate	0.28		
	25-60	15-30	1.25-1.30	0.2-0.6	0.12-0.14	6.1-7.3	<2	Moderate	0.20		
46*:											
Ess	0-11	10-15	1.35-1.40	2.0-6.0	0.08-0.12	5.6-7.8	<2	Low	0.17	5	8
	11-23	27-35	1.25-1.30	0.2-0.6	0.06-0.08	6.1-7.8	<2	Moderate	0.17		
	23-60	15-20	1.25-1.35	0.6-2.0	0.04-0.07	6.1-7.8	<2	Low	0.24		
Callings	0-11	14-18	0.94-0.98	0.6-2.0	0.13-0.15	6.1-7.8	<2	Low	0.24	2	5
	11-18	10-15	1.00-1.02	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low	0.17		
	18-32	35-45	1.05-1.07	0.06-0.2	0.09-0.11	6.1-7.8	<2	Moderate	0.15		
	32-60	25-30	1.10-1.15	0.2-0.6	0.07-0.09	6.6-7.8	<2	Low	0.15		
47	0-4	12-18	1.25-1.30	0.6-2.0	0.17-0.18	7.4-7.8	<2	Moderate	0.43	2	5
Evanston	4-25	18-32	1.40-1.50	0.6-2.0	0.17-0.18	7.4-8.4	<2	Moderate	0.43		
	25-41	18-32	1.25-1.30	0.6-2.0	0.17-0.18	7.9-9.0	<2	Moderate	0.43		
	41-60	5-15	1.45-1.55	6.0-20.0	0.08-0.11	7.9-9.0	<2	Low	0.20		
48	0-5	12-18	1.25-1.30	0.6-2.0	0.09-0.11	7.4-7.8	<2	Low	0.15	2	8
Evanston	5-25	18-32	1.40-1.50	0.6-2.0	0.17-0.18	7.4-8.4	<2	Moderate	0.43		
	25-40	18-32	1.25-1.30	0.6-2.0	0.17-0.18	7.9-9.0	<2	Moderate	0.43		
	40-60	5-15	1.45-1.55	6.0-20.0	0.08-0.11	7.9-9.0	<2	Low	0.20		
49	0-3	20-27	1.30-1.40	0.6-2.0	0.15-0.17	7.9-9.0	<4	Low	0.32	5	4L
Frandsen	3-60	20-35	1.30-1.40	0.6-2.0	0.15-0.18	7.9-9.0	<4	Moderate	0.32		
50*:											
Frandsen	0-2	20-27	1.30-1.40	0.6-2.0	0.15-0.17	7.9-9.0	<4	Low	0.32	5	4L
	2-60	20-35	1.30-1.40	0.6-2.0	0.15-0.18	7.9-9.0	<4	Moderate	0.32		
Neto	0-2	10-15	1.40-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low	0.20	3	3
	2-38	5-15	1.40-1.50	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low	0.20		
	38-60	0-5	1.50-1.55	6.0-20	0.03-0.05	7.9-8.4	<2	Low	0.15		
51*:											
Frandsen	0-5	20-27	1.30-1.40	2.0-6.0	0.11-0.13	7.9-9.0	<4	Low	0.20	5	8
	5-60	20-35	1.30-1.40	0.6-2.0	0.15-0.18	7.9-9.0	<4	Moderate	0.32		
Wiggler	0-7	18-25	1.25-1.35	0.6-2.0	0.09-0.11	7.9-8.4	<2	Low	0.15	2	8
	7-19	18-32	1.25-1.35	0.6-2.0	0.17-0.18	7.9-9.0	<2	Moderate	0.37		
	19	---	---	---	---	---	---	------------	----		
52	0-4	28-35	1.15-1.25	0.2-0.6	0.17-0.18	6.6-7.3	<2	Moderate	0.37	5	4
Hughes	4-53	35-50	1.30-1.50	0.06-0.2	0.17-0.18	6.6-7.3	<2	High	0.37		
	53-60	35-40	1.30-1.50	0.06-0.2	0.17-0.18	7.4-7.8	<2	Moderate	0.32		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
53*:											
Gerst Family----	0-3	18-27	1.25-1.30	0.6-2.0	0.17-0.19	7.9-8.4	<4	Low---------	0.28	1	4L
	3-12	18-27	1.25-1.30	0.6-2.0	0.17-0.19	7.9-8.4	<4	Low---------	0.28		
	12	---	---	---	---	---	---	------------	----		
Rock outcrop.											
54, 55----------- Greenhalgh	0-2	18-27	1.20-1.30	0.6-2.0	0.18-0.19	7.9-9.0	<2	Low---------	0.49	5	4L
	2-60	18-27	1.25-1.35	0.6-2.0	0.17-0.19	7.9-9.0	<2	Low---------	0.49		
56--------------- Grimm	0-8	5-15	1.35-1.45	2.0-6.0	0.10-0.12	7.9-9.0	<2	Low---------	0.17	1	3
	8-60	0-5	1.45-1.55	6.0-20	0.03-0.04	7.9-9.0	<2	Low---------	0.05		
57--------------- Guben	0-4	15-20	1.10-1.25	0.6-2.0	0.11-0.13	6.6-7.3	<2	Low---------	0.17	2	8
	4-14	18-30	1.10-1.30	0.6-2.0	0.08-0.12	6.6-8.4	<2	Moderate----	0.10		
	14-60	10-25	0.90-1.25	0.6-2.0	0.07-0.11	7.4-8.4	<2	Low---------	0.10		
58*:											
Guben-----------	0-4	15-20	1.10-1.25	0.6-2.0	0.11-0.13	6.6-7.3	<2	Low---------	0.17	2	8
	4-14	18-30	1.10-1.30	0.6-2.0	0.08-0.12	6.6-8.4	<2	Moderate----	0.10		
	14-60	10-25	0.90-1.25	0.6-2.0	0.07-0.11	7.4-8.4	<2	Low---------	0.10		
Showalter-------	0-10	20-25	1.25-1.35	0.6-2.0	0.13-0.14	6.6-7.8	<2	Low---------	0.10	3	8
	10-30	35-45	1.15-1.20	0.06-0.2	0.10-0.12	6.6-7.8	<2	Moderate----	0.05		
	30-60	20-25	1.25-1.30	0.6-2.0	0.08-0.13	7.4-8.4	<2	Low---------	0.15		
59--------------- Harol	0-8	15-25	1.20-1.40	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low---------	0.17	3	8
	8-26	25-35	1.40-1.60	0.2-0.6	0.09-0.12	6.6-7.8	<2	Moderate----	0.10		
	26-60	0-5	1.40-1.60	6.0-20	0.03-0.05	6.6-7.8	<2	Low---------	0.05		
60--------------- Harol	0-5	15-25	1.20-1.40	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low---------	0.17	3	8
	5-25	25-35	1.40-1.60	0.2-0.6	0.09-0.12	6.6-7.8	<2	Moderate----	0.10		
	25-60	0-5	1.40-1.60	6.0-20	0.03-0.05	6.6-7.8	<2	Low---------	0.05		
61--------------- Harol	0-5	18-27	1.25-1.30	0.6-2.0	0.08-0.10	7.4-7.8	<2	Low---------	0.17	5	8
	5-25	27-35	1.40-1.50	0.2-0.6	0.09-0.11	7.4-7.8	<2	Moderate----	0.17		
	25-60	27-35	1.25-1.30	0.2-0.6	0.09-0.11	7.4-7.8	<2	Moderate----	0.17		
62*:											
Hatch-----------	0-2	15-20	1.25-1.30	0.6-2.0	0.17-0.19	6.6-7.3	<2	Low---------	0.24	2	5
	2-23	35-45	1.20-1.25	0.06-0.2	0.17-0.19	6.6-7.3	<2	High--------	0.32		
	23-36	20-27	1.25-1.30	0.2-0.6	0.17-0.19	7.4-7.8	<2	Moderate----	0.55		
	36	---	---	---	---	---	---	------------	----		
Pahreah---------	0-1	20-27	1.25-1.30	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low---------	0.10	2	8
	1-12	20-30	1.20-1.25	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low---------	0.15		
	12-26	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low---------	0.10		
	26-38	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low---------	0.10		
	38	---	---	---	---	---	---	------------	----		
63*:											
Hatch-----------	0-2	15-20	1.25-1.30	0.6-2.0	0.17-0.19	6.6-7.3	<2	Low---------	0.24	2	5
	2-23	35-45	1.20-1.25	0.06-0.2	0.17-0.19	6.6-7.3	<2	High--------	0.32		
	23-36	20-27	1.25-1.30	0.2-0.6	0.17-0.19	7.4-7.8	<2	Moderate----	0.55		
	36	---	---	---	---	---	---	------------	----		
Swapps----------	0-3	15-20	1.25-1.30	0.6-2.0	0.13-0.15	6.1-7.8	<2	Low---------	0.17	2	8
	3-8	20-30	1.20-1.30	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low---------	0.17		
	8-23	15-30	1.20-1.30	0.6-2.0	0.08-0.09	7.9-8.4	<2	Low---------	0.10		
	23	---	---	---	---	---	---	------------	----		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
64---------------	0-12	8-15	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20	5	3
Henrieville	12-53	8-18	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20		
	53-60	2-8	1.45-1.55	6.0-20.0	0.07-0.09	7.9-8.4	<2	Low---------	0.20		
65---------------	0-5	8-15	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20	5	3
Henrieville	5-39	8-18	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20		
	39-60	8-18	1.45-1.55	2.0-6.0	0.11-0.16	7.9-9.0	<2	Low---------	0.24		
66---------------	0-12	8-15	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20	5	3
Henrieville	12-53	8-18	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20		
	53-60	2-8	1.45-1.55	6.0-20.0	0.07-0.09	7.9-8.4	<2	Low---------	0.20		
67---------------	0-5	8-15	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.20	5	3
Henrieville	5-60	8-18	1.45-1.55	2.0-6.0	0.11-0.16	7.9-9.0	<2	Low---------	0.24		
68*:											
Hernandez Family	0-3	18-27	1.25-1.30	0.6-2.0	0.17-0.18	7.9-8.4	<2	Low---------	0.28	2	4L
	3-60	27-35	1.25-1.30	0.2-0.6	0.17-0.18	7.9-8.4	<2	Moderate----	0.32		
Clapper---------	0-3	18-27	1.25-1.30	0.6-2.0	0.10-0.13	7.9-8.4	<2	Low---------	0.15	1	8
	3-10	18-27	1.25-1.30	0.6-2.0	0.10-0.13	7.9-8.4	<2	Low---------	0.20		
	10-60	18-27	1.25-1.30	0.6-2.0	0.08-0.10	7.9-9.0	<2	Low---------	0.10		
69---------------	0-6	15-20	1.20-1.40	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low---------	0.15	4	8
Ipson	6-14	20-35	1.30-1.40	0.6-2.0	0.10-0.12	7.4-7.8	<2	Low---------	0.10		
	14-36	10-25	1.30-1.50	2.0-6.0	0.08-0.10	7.9-9.0	<2	Low---------	0.10		
	36-60	0-5	1.30-1.50	2.0-6.0	0.03-0.05	7.9-9.0	<2	Low---------	0.02		
70---------------	0-3	15-20	1.20-1.40	0.6-2.0	0.08-0.09	6.6-7.8	<2	Low---------	0.10	4	8
Ipson	3-10	20-35	1.30-1.40	0.6-2.0	0.10-0.12	7.4-7.8	<2	Low---------	0.10		
	10-60	10-25	1.20-1.40	0.6-2.0	0.08-0.12	7.9-9.0	<2	Low---------	0.20		
71---------------	0-4	15-20	1.20-1.40	0.6-2.0	0.08-0.09	6.6-7.8	<2	Low---------	0.10	4	8
Ipson	4-16	20-35	1.30-1.40	0.6-2.0	0.10-0.12	7.4-7.8	<2	Low---------	0.10		
	16-38	10-25	1.30-1.50	2.0-6.0	0.08-0.10	7.9-9.0	<2	Low---------	0.10		
	38-60	10-25	1.20-1.40	0.6-2.0	0.08-0.12	7.9-9.0	<2	Low---------	0.20		
72---------------	0-28	20-25	1.25-1.30	0.6-2.0	0.16-0.18	6.6-7.8	<2	Moderate----	0.28	5	5
Jodero	28-60	18-25	1.25-1.30	0.6-2.0	0.16-0.18	7.4-9.0	<2	Moderate----	0.32		
73---------------	0-24	20-25	1.25-1.30	0.6-2.0	0.16-0.18	6.6-7.8	<2	Moderate----	0.28	5	5
Jodero	24-60	18-25	1.25-1.30	0.6-2.0	0.16-0.18	7.4-9.0	<2	Moderate----	0.32		
74---------------	0-10	20-30	1.20-1.25	0.2-0.6	0.18-0.20	7.4-7.8	<2	Moderate----	0.24	2	4L
Kade	10-32	40-45	1.15-1.20	0.06-0.2	0.17-0.19	7.4-8.4	<2	High--------	0.28		
	32-60	20-35	1.20-1.30	0.2-0.6	0.17-0.19	7.4-8.4	<2	Moderate----	0.55		
75*.											
Lava flows											
76*:											
Lazear----------	0-3	8-18	1.35-1.45	2.0-6.0	0.07-0.08	7.4-7.8	<2	Low---------	0.15	1	3
	3-14	18-27	1.25-1.30	0.6-2.0	0.17-0.18	7.4-7.8	<2	Moderate----	0.32		
	14	---	---	---	---	---	---	------------	----		
Rock outcrop.											
Badland.											

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
77	0-4	15-20	1.25-1.30	0.6-2.0	0.13-0.15	7.4-7.8	<2	Low	0.10	2	8
Losee	4-17	20-30	1.15-1.20	0.2-0.6	0.08-0.13	7.4-7.8	<2	Low	0.02		
	17-60	15-25	1.25-1.35	0.6-2.0	0.06-0.09	7.4-8.4	<2	Low	0.02		
78	0-4	10-15	1.35-1.40	2.0-6.0	0.08-0.10	7.4-7.8	<2	Low	0.05	2	8
Losee	4-17	20-30	1.15-1.20	0.2-0.6	0.08-0.13	7.4-7.8	<2	Low	0.02		
	17-60	15-25	1.25-1.35	0.6-2.0	0.06-0.09	7.4-8.4	<2	Low	0.02		
79	0-4	15-20	1.25-1.30	0.6-2.0	0.13-0.15	7.4-7.8	<2	Low	0.10	2	8
Losee	4-12	20-30	1.15-1.20	0.2-0.6	0.08-0.13	7.4-7.8	<2	Low	0.02		
	12-60	15-25	1.25-1.35	0.6-2.0	0.06-0.09	7.4-8.4	<2	Low	0.02		
80	0-12	18-27	1.25-1.30	0.6-2.0	0.15-0.17	7.9-8.4	<2	Moderate	0.28	2	4L
Luhon	12-48	18-27	1.25-1.30	0.6-2.0	0.15-0.17	7.9-9.0	<2	Moderate	0.28		
	48-60	8-12	1.35-1.45	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low	0.15		
81, 82	0-6	18-27	1.25-1.30	0.6-2.0	0.16-0.17	7.9-8.4	<2	Moderate	0.28	3	4L
Luhon	6-29	18-27	1.25-1.30	0.6-2.0	0.16-0.17	7.9-8.4	<2	Moderate	0.28		
	29-46	18-27	1.25-1.30	0.6-2.0	0.11-0.13	7.9-8.4	<2	Low	0.20		
	46-60	5-10	1.35-1.45	2.0-6.0	0.07-0.09	7.9-8.4	<2	Low	0.05		
83	0-6	18-27	1.25-1.30	0.6-2.0	0.15-0.17	7.9-8.4	<2	Moderate	0.28	2	4L
Luhon	6-60	18-27	1.25-1.30	0.6-2.0	0.15-0.17	7.9-9.0	<2	Moderate	0.28		
84	0-4	10-15	1.35-1.45	2.0-6.0	0.06-0.08	7.9-8.4	<2	Low	0.05	2	8
Luhon	4-25	18-27	1.25-1.30	0.6-2.0	0.13-0.15	7.9-9.0	<2	Low	0.20		
	25-54	18-27	1.25-1.30	0.6-2.0	0.15-0.17	7.9-9.0	<2	Moderate	0.28		
	54-60	8-12	1.35-1.45	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low	0.15		
85, 86, 87	0-6	2-10	1.40-1.50	6.0-20	0.08-0.10	6.1-7.8	<2	Low	0.32	5	2
Mespun	6-60	3-8	1.40-1.50	6.0-20	0.05-0.09	6.1-7.8	<2	Low	0.24		
88	0-5	10-18	1.35-1.45	2.0-6.0	0.10-0.13	7.9-8.4	<2	Low	0.28	5	3
Mikim	5-60	25-35	1.25-1.30	0.2-0.6	0.17-0.18	8.5-9.0	<2	Moderate	0.32		
89	0-3	18-27	1.25-1.35	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low	0.28	5	4L
Mikim	3-60	18-27	1.25-1.45	0.2-0.6	0.15-0.18	7.9-8.4	<2	Low	0.28		
90	0-5	18-27	1.25-1.35	0.6-2.0	0.13-0.19	7.9-8.4	<2	Low	0.32	5	4L
Mikim	5-60	25-35	1.25-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Moderate	0.32		
91, 92	0-4	28-35	1.25-1.35	0.2-0.6	0.17-0.19	7.9-9.0	<2	Moderate	0.37	5	4L
Mikim	4-60	28-35	1.25-1.35	0.2-0.6	0.17-0.19	7.9-9.0	<2	Moderate	0.37		
93	0-4	15-20	1.25-1.30	0.6-2.0	0.17-0.19	7.4-7.8	<2	Low	0.24	5	4L
Mitch	4-60	18-25	1.25-1.30	0.6-2.0	0.17-0.19	7.4-8.4	<2	Low	0.43		
94*:											
Mitch	0-4	15-20	1.25-1.30	0.6-2.0	0.17-0.19	7.4-7.8	<2	Low	0.24	5	4L
	4-60	18-25	1.25-1.30	0.6-2.0	0.17-0.19	7.4-8.4	<2	Low	0.43		
Riverwash.											
95	0-4	5-18	1.35-1.45	2.0-6.0	0.10-0.13	7.9-8.4	<2	Low	0.24	5	3
Mivida	4-60	10-18	1.35-1.45	2.0-6.0	0.10-0.13	7.9-9.0	<2	Low	0.24		
96	0-2	10-15	1.40-1.45	0.6-2.0	0.09-0.11	7.9-8.4	<2	Low	0.24	3	3
Neto	2-38	5-15	1.40-1.50	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low	0.20		
	38-60	0-5	1.50-1.55	6.0-20	0.03-0.05	7.9-8.4	<2	Low	0.15		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
97 Neto	0-9	12-18	1.25-1.30	2.0-6.0	0.15-0.16	8.5-9.0	<2	Low	0.37	5	3
	9-35	12-18	1.25-1.30	2.0-6.0	0.14-0.16	7.9-9.0	<2	Low	0.32		
	35-60	12-18	1.25-1.30	2.0-6.0	0.17-0.18	7.9-9.0	<2	Low	0.37		
98, 99 Notter	0-5	10-20	1.40-1.50	0.6-2.0	0.14-0.16	6.6-7.8	<2	Low	0.28	3	5
	5-14	18-30	1.25-1.30	0.6-2.0	0.13-0.15	6.6-8.4	<2	Low	0.10		
	14-29	3-10	1.35-1.45	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.05		
	29-60	3-8	1.45-1.55	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.05		
100 Notter	0-11	15-25	1.20-1.30	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low	0.28	3	5
	11-35	27-35	1.40-1.50	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate	0.28		
	35-60	15-20	1.20-1.30	0.6-2.0	0.08-0.10	7.9-9.0	2-4	Low	0.10		
101 Notter	0-3	5-10	1.35-1.45	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low	0.10	3	8
	3-22	18-30	1.25-1.30	0.6-2.0	0.13-0.15	6.6-8.4	<2	Low	0.10		
	22-37	3-10	1.35-1.45	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.05		
	37-60	3-8	1.45-1.55	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.05		
102 Notter	0-5	10-20	1.25-1.30	0.6-2.0	0.11-0.13	6.6-7.8	<2	Low	0.10	3	8
	5-14	18-30	1.25-1.30	0.6-2.0	0.13-0.15	6.6-8.4	<2	Low	0.10		
	14-29	3-10	1.35-1.45	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.05		
	29-60	3-8	1.45-1.55	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.05		
103 Notter	0-3	10-20	1.25-1.30	0.6-2.0	0.07-0.09	6.6-7.8	<2	Low	0.05	3	8
	3-15	18-30	1.40-1.50	0.6-2.0	0.13-0.15	6.6-8.4	<2	Low	0.10		
	15-60	3-8	1.45-1.55	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.02		
104 Notter Variant	0-8	20-25	1.25-1.30	0.6-2.0	0.16-0.18	7.4-8.4	<2	Low	0.28	2	5
	8-24	22-32	1.25-1.30	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate	0.32		
	24-60	1-3	1.45-1.55	6.0-20.0	0.03-0.04	7.4-8.4	<2	Low	0.17		
105*:											
Pahreah	0-1	20-27	1.25-1.30	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.10	2	8
	1-12	20-30	1.20-1.25	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.15		
	12-26	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low	0.10		
	26-38	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low	0.10		
	38	---	---	---	---	---	---	------------	----		
Sheege	0-8	5-10	1.30-1.35	6.0-20	0.06-0.08	7.4-7.8	<2	Low	0.10	1	8
	8-19	20-25	1.15-1.25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low	0.17		
	19	---	---	---	---	---	---	------------	----		
106*:											
Pahreah	0-1	20-27	1.25-1.30	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.10	2	8
	1-12	20-30	1.20-1.25	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.15		
	12-26	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low	0.10		
	26-38	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low	0.10		
	38	---	---	---	---	---	---	------------	----		
Sielo	0-9	10-20	1.35-1.70	0.6-2.0	0.15-0.17	5.6-6.5	<2	Low	0.49	2	3
	9-60	35-50	1.45-1.75	<0.06	0.15-0.18	6.6-8.4	<2	High	0.28		
107*:											
Pahreah	0-1	20-27	1.25-1.30	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.10	2	8
	1-12	20-30	1.20-1.25	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.15		
	12-26	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low	0.10		
	26-38	18-27	1.15-1.25	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low	0.10		
	38	---	---	---	---	---	---	------------	----		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
107*:											
Swapps	0-3	15-20	1.25-1.30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low	0.17	2	8
	3-8	20-30	1.20-1.30	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low	0.17		
	8-23	15-30	1.20-1.30	0.6-2.0	0.08-0.09	7.9-8.4	<2	Low	0.10		
	23	---	---	---	---	---	---	------------	----		
108*:											
Panguitch	0-5	10-15	1.35-1.45	2.0-6.0	0.08-0.09	6.6-7.3	<2	Low	0.10	4	8
	5-11	27-30	1.25-1.30	0.6-2.0	0.13-0.15	7.4-7.8	<2	Moderate	0.10		
	11-47	10-20	1.35-1.45	2.0-6.0	0.07-0.08	7.9-8.4	<2	Low	0.10		
	47-60	0-15	1.35-1.55	6.0-20	0.04-0.06	7.9-8.4	<2	Low	0.10		
Mitch	0-4	15-20	1.25-1.30	0.6-2.0	0.17-0.19	7.4-7.8	<2	Low	0.24	5	4L
	4-60	18-25	1.25-1.30	0.6-2.0	0.17-0.19	7.4-8.4	<2	Low	0.43		
109*:											
Panguitch	0-5	18-25	1.25-1.30	0.6-2.0	0.12-0.14	6.6-7.3	<2	Low	0.10	4	8
	5-11	27-30	1.25-1.30	0.6-2.0	0.13-0.15	7.4-7.8	<2	Moderate	0.10		
	11-47	10-20	1.35-1.45	2.0-6.0	0.07-0.08	7.9-8.4	<2	Low	0.10		
	47-60	0-15	1.35-1.55	6.0-20	0.04-0.06	7.9-8.4	<2	Low	0.10		
Riverwash.											
110	0-3	18-25	1.25-1.30	0.6-2.0	0.12-0.14	7.4-8.4	<2	Low	0.10	1	8
Paunsaugunt	3-15	10-18	1.35-1.40	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low	0.10		
	15	---	---	---	---	---	---	------------	----		
111*:											
Paunsaugunt	0-3	18-25	1.25-1.30	0.6-2.0	0.12-0.14	7.4-8.4	<2	Low	0.10	1	8
	3-15	10-18	1.35-1.40	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low	0.10		
	15	---	---	---	---	---	---	------------	----		
Syrett	0-1	15-25	1.00-1.15	0.6-2.0	0.09-0.12	7.4-7.8	<2	Low	0.10	2	8
	1-38	20-30	0.95-1.15	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low	0.10		
	38	---	---	---	---	---	---	------------	----		
112*. Playas											
113	0-33	10-18	1.35-1.45	2.0-6.0	0.10-0.12	6.6-7.8	<2	Low	0.17	5	3
Plite	33-60	10-15	1.35-1.45	2.0-6.0	0.10-0.12	6.6-7.8	<2	Low	0.17		
114	0-6	5-10	1.45-1.55	2.0-6.0	0.07-0.09	7.9-8.4	<2	Low	0.15	1	2
Podo	6-19	10-25	1.30-1.45	2.0-6.0	0.08-0.12	7.9-8.4	<2	Low	0.15		
	19	---	---	---	---	---	---	------------	----		
115*:											
Podo	0-2	15-25	1.25-1.30	2.0-6.0	0.10-0.12	8.5-9.0	<2	Low	0.17	1	8
	2-13	25-35	1.25-1.30	2.0-6.0	0.10-0.13	7.9-9.0	<2	Low	0.17		
	13	---	---	---	---	---	---	------------	----		
Wiggler	0-4	28-32	1.25-1.35	0.2-0.6	0.12-0.14	8.5-9.0	<2	Moderate	0.20	2	4L
	4-18	18-32	1.25-1.35	0.6-2.0	0.17-0.18	7.9-9.0	<2	Moderate	0.37		
	18	---	---	---	---	---	---	------------	----		
116*:											
Podo	0-4	4-10	1.35-1.40	2.0-6.0	0.07-0.08	8.5-9.0	<2	Low	0.10	1	8
	4-16	10-25	1.30-1.40	2.0-6.0	0.08-0.12	7.9-8.4	<2	Low	0.24		
	16	---	---	---	---	---	---	------------	----		
Rock outcrop.											

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
117-------------	0-4	15-25	1.25-1.30	0.6-2.0	0.07-0.09	6.6-7.8	<2	Low---------	0.05	5	8
Quilt	4-43	35-45	1.25-1.30	0.06-0.2	0.13-0.15	6.6-7.8	<2	Moderate----	0.15		
	43-60	10-25	1.30-1.45	2.0-6.0	0.12-0.14	7.4-8.4	<2	Low---------	0.10		
118-------------	0-5	15-25	1.25-1.30	0.6-2.0	0.07-0.09	6.6-7.8	<2	Low---------	0.05	5	8
Quilt	5-42	35-45	1.25-1.30	0.06-0.2	0.13-0.15	6.6-7.8	<2	Moderate----	0.15		
	42-60	10-25	1.30-1.45	2.0-6.0	0.12-0.14	7.4-8.4	<2	Low---------	0.10		
119-------------	0-8	12-20	1.30-1.45	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low---------	0.10	1	3
Redcreek	8-19	8-18	1.30-1.45	2.0-6.0	0.07-0.08	7.4-9.0	<2	Low---------	0.10		
	19	---	---	---	---	---	---	------------	----		
120-------------	0-8	15-27	1.25-1.30	0.6-2.0	0.13-0.15	7.4-8.4	<2	Low---------	0.20	1	8
Redcreek	8-19	8-18	1.30-1.45	2.0-6.0	0.07-0.08	7.4-9.0	<2	Low---------	0.10		
	19	---	---	---	---	---	---	------------	----		
121*. Riverwash											
122*. Rock outcrop											
123*: Rock outcrop.											
Podo------------	0-4	4-10	1.35-1.40	2.0-6.0	0.07-0.08	8.5-9.0	<2	Low---------	0.10	1	8
	4-16	10-25	1.30-1.40	2.0-6.0	0.08-0.12	7.9-8.4	<2	Low---------	0.24		
	16	---	---	---	---	---	---	------------	----		
124*. Rubble land											
125-------------	0-4	27-35	1.20-1.25	0.06-0.2	0.17-0.19	7.9-8.4	<2	Moderate----	0.24	1	4L
Ruko	4-15	35-45	1.20-1.25	<0.06	0.17-0.19	7.9-8.4	<2	Moderate----	0.24		
	15	---	---	---	---	---	---	------------	----		
126*:											
Ruko------------	0-4	27-35	1.20-1.25	0.06-0.2	0.17-0.19	7.9-8.4	<2	Moderate----	0.24	1	4L
	4-19	35-45	1.20-1.25	<0.06	0.17-0.19	7.9-8.4	<2	Moderate----	0.24		
	19	---	---	---	---	---	---	------------	----		
Podo------------	0-6	10-15	1.35-1.40	2.0-6.0	0.07-0.08	8.5-9.0	<2	Low---------	0.10	1	8
	6-19	10-25	1.30-1.40	2.0-6.0	0.08-0.12	7.9-8.4	<2	Low---------	0.24		
	19	---	---	---	---	---	---	------------	----		
127, 128---------	0-5	20-25	1.25-1.30	0.6-2.0	0.16-0.18	6.6-8.4	<2	Moderate----	0.24	5	5
Schauson	5-25	27-35	1.25-1.30	0.2-0.6	0.17-0.18	6.6-7.3	<2	Moderate----	0.32		
	25-60	25-35	1.25-1.30	0.2-0.6	0.17-0.18	6.6-7.8	<2	Moderate----	0.32		
129*:											
Sevier----------	0-4	8-17	1.25-1.35	0.6-2.0	0.14-0.16	6.6-7.3	<2	Low---------	0.24	1	3
	4-24	35-50	1.20-1.30	<0.06	0.16-0.18	6.6-7.3	<2	Moderate----	0.32		
	24	---	---	---	---	---	---	------------	----		
Skutum----------	0-17	10-15	1.40-1.45	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low---------	0.24	3	3
	17-36	35-45	1.20-1.25	0.06-0.2	0.13-0.16	6.1-7.3	<2	Moderate----	0.20		
	36-50	15-20	1.40-1.45	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low---------	0.20		
	50	---	---	---	---	---	---	------------	----		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
130*:											
Sheege----------	0-2	5-10	1.30-1.35	6.0-20	0.06-0.08	7.4-7.8	<2	Low---------	0.17	1	8
	2-19	20-25	1.15-1.25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low---------	0.17		
	19	---	---	---	---	---	---	------------	----		
Swapps----------	0-3	15-20	1.25-1.30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low---------	0.17	2	8
	3-15	20-30	1.20-1.30	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low---------	0.17		
	15-23	15-30	1.20-1.30	0.6-2.0	0.08-0.09	7.9-8.4	<2	Low---------	0.10		
	23	---	---	---	---	---	---	------------	----		
131*:											
Showalter-------	0-10	2-25	1.25-1.30	0.6-2.0	0.11-0.13	6.6-7.8	<2	Low---------	0.15	3	8
	10-30	35-45	1.15-1.20	0.06-0.2	0.10-0.12	6.6-7.8	<2	Moderate----	0.05		
	30-60	20-25	1.25-1.30	0.6-2.0	0.08-0.13	7.4-8.4	<2	Low---------	0.15		
Guben-----------	0-10	15-20	1.10-1.25	0.6-2.0	0.11-0.13	6.6-7.3	<2	Low---------	0.17	2	8
	10-14	18-30	1.10-1.30	0.6-2.0	0.08-0.12	6.6-8.4	<2	Moderate----	0.10		
	14-60	10-25	0.90-1.25	0.6-2.0	0.07-0.11	7.4-8.4	<2	Low---------	0.10		
	60-90	10-20	1.10-1.30	2.0-6.0	0.06-0.09	7.4-8.4	<2	Low---------	0.10		
132--------------	0-10	28-35	1.10-1.25	0.2-0.6	0.17-0.18	8.5-9.0	<2	Moderate----	0.37	5	4L
Shupert	10-42	28-35	1.25-1.30	0.2-0.6	0.17-0.18	7.9-9.0	<2	Moderate----	0.37		
	42-60	18-27	1.25-1.30	0.6-2.0	0.16-0.17	7.9-9.0	<2	Low---------	0.32		
133--------------	0-9	10-20	1.35-1.70	0.6-2.0	0.15-0.17	5.6-6.5	<2	Low---------	0.49	2	3
Sielo	9-60	35-50	1.45-1.75	<0.06	0.15-0.18	6.6-8.4	<2	High--------	0.28		
134--------------	0-17	15-25	1.25-1.30	0.6-2.0	0.15-0.20	6.1-7.3	<2	Low---------	0.32	3	3
Skutum	17-36	35-45	1.20-1.25	0.06-0.2	0.13-0.16	6.1-7.3	<2	Moderate----	0.20		
	36-50	15-20	1.40-1.45	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low---------	0.20		
	50	---	---	---	---	---	---	------------	----		
135--------------	0-17	10-15	1.40-1.45	0 6-2.0	0.09-0.11	6.1-7.3	<2	Low---------	0.24	3	3
Skutum	17-36	35-45	1.20-1.25	0.06-0.2	0.13-0.16	6.1-7.3	<2	Moderate----	0.20		
	36-50	15-20	1.40-1.45	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low---------	0.20		
	50	---	---	---	---	---	---	------------	----		
136--------------	0-3	15-20	1.25-1.30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low---------	0.17	2	8
Swapps	3-8	20-30	1.20-1.30	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low---------	0.17		
	8-36	15-30	1.20-1.30	0.6-2.0	0.08-0.09	7.9-8.4	<2	Low---------	0.10		
	36	---	---	---	---	---	---	------------	----		
137--------------	0-9	15-20	1.25-1.30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low---------	0.17	2	8
Swapps	9-20	20-30	1.20-1.30	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low---------	0.17		
	20-36	15-30	1.20-1.30	0.6-2.0	0.08-0.09	7.9-8.4	<2	Low---------	0.10		
	36	---	---	---	---	---	---	------------	----		
138--------------	0-1	15-25	1.00-1.15	0.6-2.0	0.09-0.12	7.4-7.8	<2	Low---------	0.10	2	8
Syrett	1-38	20-30	0.95-1.15	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low---------	0.10		
	38	---	---	---	---	---	---	------------	----		
139*:											
Syrett----------	0-1	15-25	1.00-1.15	0.6-2.0	0.09-0.12	7.4-7.8	<2	Low---------	0.10	2	8
	1-38	20-30	0.95-1.15	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low---------	0.10		
	38	---	---	---	---	---	---	------------	----		
Frandsen--------	0-2	20-27	1.30-1.40	0.6-2.0	0.15-0.17	7.9-9.0	<4	Low---------	0.32	5	4L
	2-60	20-35	1.30-1.40	0.6-2.0	0.15-0.18	7.9-9.0	<4	Moderate----	0.32		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodi-bility group
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
140*:											
Syrett----------	0-1	15-25	1.00-1.15	0.6-2.0	0.09-0.12	7.4-7.8	<2	Low---------	0.10	2	8
	1-38	20-30	0.95-1.15	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low---------	0.10		
	38	---	---	---	---	---	---	------------	----		
Vanet-----------	0-2	15-20	1.25-1.30	0.6-2.0	0.11-0.13	6.6-7.8	<2	Low---------	0.15	2	8
	2-14	20-30	1.20-1.25	0.6-2.0	0.09-0.12	7.4-7.8	<2	Low---------	0.15		
	14	---	---	---	---	---	---	------------	----		
141-------------- Tebbs	0-5	5-15	1.30-1.45	2.0-6.0	0.10-0.12	7.4-9.0	<4	Low---------	0.17	5	3
	5-60	3-18	1.30-1.55	2.0-6.0	0.11-0.14	7.4-9.0	<4	Low---------	0.37		
142-------------- Tebbs	0-8	10-15	1.25-1.30	0.6-2.0	0.16-0.18	7.4-8.4	<4	Low---------	0.43	5	4L
	8-60	3-18	1.30-1.55	2.0-6.0	0.11-0.14	7.4-9.0	<4	Low---------	0.37		
143-------------- Tebbs	0-5	10-15	1.25-1.30	0.6-2.0	0.16-0.18	7.4-8.4	<4	Low---------	0.43	5	4L
	5-60	3-18	1.30-1.55	2.0-6.0	0.11-0.14	7.4-9.0	<4	Low---------	0.37		
144-------------- Tolman	0-12	20-27	1.25-1.30	0.6-2.0	0.09-0.10	7.4-7.8	<2	Low---------	0.15	1	8
	12-16	18-30	1.25-1.35	0.6-2.0	0.08-0.10	7.9-8.4	<2	Low---------	0.24		
	16	---	---	---	---	---	---	------------	----		
145*:											
Tolman----------	0-3	15-25	1.20-1.30	0.6-2.0	0.08-0.11	6.6-7.8	<2	Low---------	0.15	1	8
	3-17	18-30	1.25-1.35	0.6-2.0	0.08-0.10	7.9-8.4	<2	Low---------	0.24		
	17	---	---	---	---	---	---	------------	----		
Rock outcrop.											
146-------------- Tridell	0-8	10-15	1.25-1.30	0.6-2.0	0.14-0.16	7.4-8.4	<2	Low---------	0.28	3	4L
	8-60	5-15	1.30-1.45	2.0-6.0	0.06-0.10	7.9-9.0	<2	Low---------	0.05		
147-------------- Tridell	0-14	15-20	1.25-1.35	0.6-2.0	0.13-0.14	7.9-8.4	<2	Low---------	0.20	3	8
	14-60	5-15	1.35-1.55	2.0-6.0	0.06-0.10	7.9-9.0	<2	Low---------	0.10		
148-------------- Tridell	0-8	10-15	1.25-1.35	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low---------	0.15	3	8
	8-27	5-15	1.35-1.55	2.0-6.0	0.06-0.10	7.9-9.0	<2	Low---------	0.10		
	27-41	0-5	1.35-1.55	6.0-20	0.06-0.10	>8.4	<2	Low---------	0.02		
	41-60	10-15	1.30-1.60	2.0-6.0	0.09-0.15	>8.4	<2	Low---------	0.20		
149*:											
Tridell---------	0-7	18-27	1.25-1.30	2.0-6.0	0.08-0.10	7.9-8.4	<2	Low---------	0.05	1	8
	7-60	15-25	1.25-1.30	2.0-6.0	0.06-0.08	7.9-8.4	<2	Low---------	0.05		
Rock outcrop.											
150-------------- Ustic Torrifluvents	0-11	8-12	1.30-1.45	2.0-6.0	0.10-0.11	7.9-8.4	<2	Low---------	0.20	2	3
	11-60	8-18	1.30-1.45	2.0-6.0	0.04-0.06	7.9-9.0	<2	Low---------	0.15		
151-------------- Venture	0-6	15-20	1.25-1.35	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low---------	0.15	1	8
	6-15	27-35	1.25-1.35	0.2-0.6	0.08-0.10	6.6-8.4	<2	Moderate----	0.20		
	15	---	---	---	---	---	---	------------	----		
152-------------- Venture	0-6	15-20	1.20-1.30	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low---------	0.10	1	8
	6-15	27-35	1.25-1.35	0.2-0.6	0.08-0.10	6.6-8.4	<2	Moderate----	0.20		
	15	---	---	---	---	---	---	------------	----		
153-------------- Venture	0-4	15-20	1.25-1.35	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low---------	0.15	1	8
	4-19	27-35	1.25-1.35	0.2-0.6	0.08-0.10	6.6-8.4	<2	Moderate----	0.20		
	19	---	---	---	---	---	---	------------	----		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
154-------------- Villy Family	0-11	28-35	1.25-1.35	0.06-0.2	0.17-0.18	7.9-9.0	2-4	Moderate----	0.24	5	8
	11-60	28-35	1.25-1.35	0.06-0.2	0.17-0.18	7.9-9.0	4-8	Moderate----	0.37		
155, 156--------- Waltershow	0-3	15-27	1.25-1.30	0.6-2.0	0.09-0.11	7.4-7.8	<2	Low---------	0.05	3	8
	3-20	35-45	1.30-1.50	0.06-0.2	0.11-0.14	7.4-7.8	<2	Moderate----	0.05		
	20-39	5-10	1.30-1.45	6.0-20.0	0.05-0.07	7.9-9.0	<2	Low---------	0.05		
	39-60	2-8	1.45-1.55	6.0-20.0	0.02-0.03	7.9-8.4	<2	Low---------	0.02		
157*:											
Waltershow------	0-3	15-27	1.25-1.30	0.6-2.0	0.09-0.11	7.4-7.8	<2	Low---------	0.05	3	8
	3-20	35-45	1.30-1.50	0.06-0.2	0.11-0.14	7.4-7.8	<2	Moderate----	0.05		
	20-39	5-10	1.30-1.45	6.0-20.0	0.05-0.07	7.9-9.0	<2	Low---------	0.05		
	39-60	2-8	1.45-1.55	6.0-20.0	0.02-0.03	7.9-8.4	<2	Low---------	0.02		
Venture---------	0-6	15-20	1.25-1.35	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low---------	0.15	1	8
	6-15	27-35	1.25-1.35	0.2-0.6	0.08-0.10	6.6-8.4	<2	Moderate----	0.20		
	15	---	---	---	---	---	---	-----------	----		
Rock outcrop.											
158-------------- Whiteman	0-2	10-15	1.40-1.45	0.6-2.0	0.06-0.08	6.6-8.4	<2	Low---------	0.02	1	8
	2-11	30-35	1.25-1.30	0.06-0.2	0.07-0.11	6.6-8.4	<2	Low---------	0.05		
	11	---	---	---	---	---	---	-----------	----		
159*:											
Whiteman--------	0-2	10-15	1.40-1.45	0.6-2.0	0.06-0.08	6.6-8.4	<2	Low---------	0.02	1	8
	2-15	30-35	1.25-1.30	0.06-0.2	0.07-0.11	6.6-8.4	<2	Low---------	0.05		
	15	---	---	---	---	---	---	-----------	----		
Skutum----------	0-17	10-15	1.40-1.45	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low---------	0.24	3	3
	17-36	35-45	1.20-1.25	0.06-0.2	0.13-0.16	6.1-7.3	<2	Moderate----	0.20		
	36-50	15-20	1.40-1.45	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low---------	0.20		
	50	---	---	---	---	---	---	-----------	----		
160-------------- Widtsoe	0-8	15-20	1.40-1.50	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low---------	0.05	2	8
	8-19	25-35	1.25-1.40	0.2-0.6	0.10-0.13	6.6-7.3	<2	Low---------	0.05		
	19-60	10-20	1.35-1.50	0.2-0.6	0.05-0.08	7.4-9.0	<2	Low---------	0.05		
161-------------- Wiggler	0-4	20-27	1.25-1.35	0.6-2.0	0.13-0.14	8.5-9.0	<2	Low---------	0.24	2	4L
	4-18	18-32	1.25-1.35	0.6-2.0	0.17-0.18	7.9-9.0	<2	Moderate----	0.37		
	18	---	---	---	---	---	---	-----------	----		
162*:											
Wiggler---------	0-7	18-25	1.25-1.35	0.6-2.0	0.09-0.11	7.9-8.4	<2	Low---------	0.15	2	8
	7-19	18-32	1.25-1.35	0.6-2.0	0.17-0.18	7.9-9.0	<2	Moderate----	0.37		
	19	---	---	---	---	---	---	-----------	----		
Guben-----------	0-8	5-15	1.15-1.25	0.6-2.0	0.06-0.09	6.6-7.3	<2	Low---------	0.10	2	8
	8-60	10-25	0.90-1.25	0.6-2.0	0.07-0.11	7.4-8.4	<2	Low---------	0.10		
163*:											
Wiggler---------	0-12	28-32	1.25-1.35	0.2-0.6	0.12-0.14	8.5-9.0	<2	Moderate----	0.20	2	4L
	12	---	---	---	---	---	---	-----------	----		
Rock outcrop.											
Podo------------	0-5	15-25	1.25-1.30	2.0-6.0	0.10-0.12	8.5-9.0	<2	Low---------	0.17	1	8
	5-13	25-35	1.25-1.30	2.0-6.0	0.10-0.13	7.9-9.0	<2	Low---------	0.17		
	13	---	---	---	---	---	---	-----------	----		

See footnote at end of table.

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				
164--------------	0-4	10-20	1.45-1.50	2.0-6.0	0.08-0.10	7.4-7.8	<2	Low---------	0.05	3	8
Winetti	4-24	5-15	1.40-1.45	2.0-6.0	0.06-0.11	7.4-8.4	<2	Low---------	0.15		
	24-60	5-10	1.35-1.40	2.0-6.0	0.04-0.08	7.4-8.4	<2	Low---------	0.10		
165*:											
Winnemucca------	0-16	18-27	1.25-1.30	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low---------	0.17	2	8
	16-60	35-45	1.15-1.25	0.06-0.2	0.08-0.12	6.1-7.3	<2	Moderate----	0.10		
Hoodle----------	0-9	10-15	1.25-1.30	0.6-2.0	0.13-0.14	6.1-7.3	<2	Low---------	0.17	2	8
	9-19	20-30	1.25-1.30	0.6-2.0	0.10-0.12	6.1-7.3	<2	Moderate----	0.05		
	19-60	10-20	1.30-1.40	2.0-6.0	0.05-0.07	7.4-8.4	<2	Low---------	0.05		
166--------------	0-7	10-18	1.25-1.30	0.6-2.0	0.17-0.18	7.9-8.4	<2	Low---------	0.28	5	4L
Yarts	7-60	15-18	1.30-1.35	2.0-6.0	0.12-0.15	7.9-9.0	<2	Low---------	0.28		
167, 168---------	0-10	12-18	1.35-1.45	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low---------	0.17	5	3
Yarts	10-60	10-18	1.35-1.40	2.0-6.0	0.10-0.14	7.4-8.4	<2	Low---------	0.20		
169--------------	0-2	8-18	1.25-1.30	0.6-2.0	0.17-0.18	7.4-7.8	<2	Low---------	0.32	3	5
Yenlo	2-23	27-32	1.25-1.30	0.2-0.6	0.17-0.18	7.4-7.8	<2	Moderate----	0.32		
	23-60	20-30	1.25-1.30	0.2-0.6	0.17-0.18	8.5-9.0	<2	Moderate----	0.28		
170--------------	0-5	15-27	1.25-1.30	0.6-2.0	0.08-0.11	6.6-7.8	<2	Low---------	0.10	3	8
Zillion	5-20	27-35	1.40-1.50	0.2-0.6	0.10-0.13	6.6-7.8	<2	Moderate----	0.10		
	20-30	15-27	1.25-1.30	0.6-2.0	0.08-0.10	7.9-9.0	<2	Low---------	0.05		
	30-60	8-15	1.35-1.45	2.0-6.0	0.05-0.08	7.9-9.0	<2	Low---------	0.05		
171--------------	0-12	18-27	1.25-1.40	0.6-2.0	0.15-0.17	7.9-8.4	<2	Low---------	0.37	5	4L
Zinzer	12-36	28-35	1.25-1.40	0.2-0.6	0.16-0.18	8.5-9.0	<2	Moderate----	0.24		
	36-60	10-27	1.25-1.50	0.6-2.0	0.10-0.17	8.5-9.0	<4	Low---------	0.37		
172--------------	0-2	20-27	1.25-1.30	0.6-2.0	0.08-0.10	7.9-8.4	2-4	Low---------	0.10	1	8
Zyme	2-18	35-50	1.25-1.30	0.06-0.2	0.17-0.19	7.9-8.4	2-4	High--------	0.28		
	18	---	---	---	---	---	---	------------	----		
173*:											
Zyme------------	0-2	40-45	1.10-1.25	0.06-0.2	0.17-0.18	7.9-8.4	2-4	High--------	0.24	1	4
	2-11	35-50	1.25-1.30	0.06-0.2	0.17-0.19	7.9-8.4	2-4	High--------	0.28		
	11	---	---	---	---	---	---	------------	----		
Lazear----------	0-3	8-18	1.35-1.45	2.0-6.0	0.07-0.08	7.4-7.8	<2	Low---------	0.15	1	3
	3-14	18-27	1.25-1.30	0.6-2.0	0.17-0.18	7.4-7.8	<2	Moderate----	0.32		
	14	---	---	---	---	---	---	------------	----		
Rock outcrop.											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SOIL AND WATER FEATURES

("Flooding" and terms such as "rare" and "brief" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
1*:								
Ahlstrom	D	None	---	>60	---	Moderate	High	Moderate.
Osote	D	None	---	>60	---	Moderate	High	Moderate.
2, 3, 4, 5 Alldown	B	None	---	>60	---	Moderate	High	Moderate.
6, 7 Andys	B	None	---	>60	---	Moderate	High	Moderate.
8*:								
Badland.								
Cannonville	D	None	---	7-20	Soft	Low	High	High.
Rock outcrop.								
9*:								
Badland.								
Rock outcrop.								
Paunsaugunt	D	None	---	10-20	Hard	Moderate	High	Moderate.
10, 11 Baldfield	C	None	---	>60	---	Moderate	High	High.
12 Barx	B	None	---	>60	---	Moderate	High	Low.
13 Bayfield	C	None	---	>60	---	Low	High	Moderate.
14 Befar	D	None	---	>60	---	Low	High	High.
15 Behanin	B	None	---	>60	---	Moderate	High	Moderate.
16* Blanchard Family	A	None	---	40-60	Hard	Low	Moderate	Low.
17 Borollic Natrargids	C	Rare	---	>60	---	Moderate	High	Moderate.
18 Broncho	A	None	---	>60	---	Moderate	High	Moderate.
19, 20, 21, 22, 23, 24 Bruman	B	None	---	>60	---	Moderate	High	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
25, 26 Brycan	B	None	---	>60	---	Moderate	High	Moderate.
27 Bushvalley	D	None	---	7-2	Hard	Moderate	Moderate	Moderate.
28*:								
Callings	C	None	---	>60	---	Moderate	Moderate	Low.
Winnemucca	B	None	---	>60	---	Moderate	Moderate	Low.
29, 30 Cannonville	D	None	---	7-20	Soft	Low	High	High.
31*:								
Castino	C	None	---	20-40	Hard	Moderate	Moderate	Low.
Behanin	B	None	---	>60	---	Moderate	High	Moderate.
32*:								
Castino	C	None	---	20-40	Hard	Moderate	Moderate	Low.
Tica Family	D	None	---	15-20	Hard	Moderate	Moderate	Low.
33*:								
Castino	D	None	---	20-40	Hard	Moderate	Moderate	Low.
Winnemucca	B	None	---	>60	---	Moderate	Moderate	Low.
34*:								
Circleville	C	None	---	20-40	Hard	Moderate	High	Moderate.
Rock outcrop.								
35, 36 Clapper	B	None	---	>60	---	Moderate	High	Low.
37, 38 Codley	B	None	---	>60	---	Moderate	High	Moderate.
39*:								
Comodore	D	None	---	10-20	Hard	Moderate	Moderate	---
Rock outcrop.								
40 Crestline	B	None	---	>60	---	Moderate	High	Low.
41 Dalcan	C	None	---	20-40	Hard	Moderate	High	Moderate.
42, 43 Descot	B	None	---	>60	---	Moderate	High	Moderate.
44 Dimyaw Family	C	None	---	>60	---	Moderate	High	Moderate.
45 Echard	D	None	---	>60	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
46*:								
Ess	B	None	---	>60	---	Moderate	Moderate	Moderate.
Callings	C	None	---	>60	---	Moderate	Moderate	Low.
47, 48 Evanston	B	None	---	>60	---	Moderate	High	Moderate.
49 Frandsen	B	None	---	>60	---	Moderate	High	Moderate.
50*:								
Frandsen	B	None	---	>60	---	Moderate	High	Moderate.
Neto	B	Rare	---	>60	---	Moderate	High	Moderate.
51*:								
Frandsen	B	None	---	>60	---	Moderate	High	Moderate.
Wiggler	D	None	---	8-20	Soft	Moderate	High	Moderate.
52 Fughes	C	None	---	>60	---	Moderate	Moderate	Low.
53*:								
Gerst Family	D	None	---	10-20	Soft	Moderate	High	Moderate.
Rock outcrop.								
54, 55 Greenhalgh	B	Rare	---	>60	---	Moderate	High	Moderate.
56 Grimm	A	None	---	>60	---	Low	High	Moderate.
57 Guben	B	None	---	>60	---	Moderate	High	Moderate.
58*:								
Guben	B	None	---	>60	---	Moderate	High	Moderate.
Showalter	C	None	---	>60	---	Moderate	High	Moderate.
59, 60 Harol	B	None	---	>60	---	Moderate	Moderate	Low.
61 Harol	B	None	---	>60	---	Moderate	High	Low.
62*:								
Hatch	C	None	---	20-40	Soft	Moderate	Moderate	Low.
Pahreah	C	None	---	20-40	Hard	Moderate	High	Moderate.
63*:								
Hatch	C	None	---	20-40	Soft	Moderate	Moderate	Low.
Swapps	C	None	---	20-40	Hard	Moderate	High	Moderate.
64, 65, 66, 67 Henrieville	B	None	---	>60	---	Low	High	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
68*:								
Hernandez Family	B	None	---	>60	---	Moderate	High	Moderate.
Clapper	B	None	---	>60	---	Moderate	High	Low.
69, 70, 71 Ipson	B	None	---	>60	---	Moderate	High	Moderate.
72, 73 Jodero	B	Rare	---	>60	---	Moderate	High	Moderate.
74 Kade	D	Rare	---	>60	---	Moderate	High	Moderate.
75*. Lava flows								
76*:								
Lazear	D	None	---	10-20	Hard	Moderate	Moderate	Low.
Rock outcrop.								
Badland.								
77, 78, 79 Losee	B	None	---	>60	---	Moderate	High	Moderate.
80, 81, 82, 83, 84 Luhon	B	None	---	>60	---	Moderate	High	Moderate.
85, 86, 87 Mespun	A	None	---	>60	---	Low	Moderate	Low.
88, 89, 90, 91, 92 Mikim	B	None	---	>60	---	Moderate	High	Moderate.
93 Mitch	B	Rare	---	>60	---	Moderate	High	Moderate.
94*:								
Mitch	B	Rare	---	>60	---	Moderate	High	Moderate.
Riverwash.								
95 Mivida	B	None	---	>60	---	Low	High	Moderate.
96 Neto	B	Rare	---	>60	---	Moderate	High	Moderate.
97 Neto	B	Rare	---	>60	---	High	High	Moderate.
98, 99, 100, 101, 102, 103 Notter	B	None	---	>60	---	Moderate	High	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
104--------------- Notter Variant	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
105*:								
Pahreah----------	C	None-------	---	20-40	Hard	Moderate-----	High-----	Moderate.
Sheege-----------	D	None-------	---	16-20	Hard	Moderate-----	High-----	Low.
106*:								
Pahreah----------	C	None-------	---	20-40	Hard	Moderate-----	High-----	Moderate.
Sielo------------	D	None-------	---	>60	---	Moderate-----	High-----	Moderate.
107*:								
Pahreah----------	C	None-------	---	20-40	Hard	Moderate-----	High-----	Moderate.
Swapps-----------	C	None-------	---	20-40	Hard	Moderate-----	High-----	Moderate.
108*:								
Panguitch--------	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
Mitch------------	B	Frequent---	May-Aug	>60	---	Moderate-----	High-----	Moderate.
109*:								
Panguitch--------	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
Riverwash.								
110--------------- Paunsaugunt	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.
111*:								
Paunsaugunt------	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.
Syrett-----------	C	None-------	---	20-40	Hard	Moderate-----	High-----	Moderate.
112*. Playas								
113--------------- Plite	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
114--------------- Podo	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.
115*:								
Podo-------------	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.
Wiggler----------	D	None-------	---	8-20	Soft	Moderate-----	High-----	Moderate.
116*:								
Podo-------------	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.
Rock outcrop.								
117, 118---------- Quilt	D	None-------	---	>60	---	Moderate-----	High-----	Moderate.
119, 120---------- Redcreek	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
121*. Riverwash								
122*. Rock outcrop								
123*: Rock outcrop.								
Podo	D	None	---	10-20	Hard	Moderate	High	Moderate.
124*. Rubble land								
125 Ruko	D	None	---	10-20	Soft	Moderate	High	Moderate.
126*: Ruko	D	None	---	10-20	Soft	Moderate	High	Moderate.
Podo	D	None	---	10-20	Hard	Moderate	High	Moderate.
127, 128 Schauson	B	None	---	>60	---	Moderate	Moderate	Low.
129*: Sevier	D	None	---	20-40	Soft	Moderate	Moderate	Low.
Skutum	C	None	---	50-60	Soft	Moderate	Moderate	Low.
130*: Sheege	D	None	---	16-20	Hard	Moderate	High	Low.
Swapps	C	None	---	20-40	Hard	Moderate	High	Moderate.
131*: Showalter	C	None	---	>60	---	Moderate	High	Moderate.
Guben	B	None	---	>60	---	Moderate	High	Moderate.
132 Shupert	C	Rare	---	>60	---	High	High	Moderate.
133 Sielo	D	None	---	>60	---	Moderate	High	Moderate.
134, 135 Skutum	C	None	---	50-60	Soft	Moderate	Moderate	Low.
136, 137 Swapps	C	None	---	20-40	Hard	Moderate	High	Moderate.
138 Syrett	C	None	---	20-40	Hard	Moderate	High	Moderate.
139*: Syrett	C	None	---	20-40	Hard	Moderate	High	Moderate.
Frandsen	B	Rare	---	>60	---	Moderate	High	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
140*:								
Syrett	C	None	---	20-40	Hard	Moderate	High	Moderate.
Vanet	D	None	---	10-20	Soft	Moderate	Moderate	Low.
141, 142, 143 Tebbs	B	None	---	>60	---	Moderate	High	Moderate.
144 Tolman	D	None	---	10-20	Hard	Moderate	High	Low.
145*:								
Tolman	D	None	---	10-20	Hard	Moderate	High	Low.
Rock outcrop.								
146, 147, 148 Tridell	B	None	---	>60	---	Moderate	High	Moderate.
149*:								
Tridell	B	None	---	>60	---	Moderate	High	Low.
Rock outcrop.								
150 Ustic Torrifluvents	B	Occasional	---	>60	---	Moderate	High	Moderate.
151, 152, 153 Venture	D	None	---	>60	---	Moderate	High	Low.
154 Villy Family	D	Rare	---	>60	---	High	High	Low.
155, 156 Waltershow	B	None	---	>60	---	Low	High	Moderate.
157*:								
Waltershow	B	None	---	>60	---	Low	High	Moderate.
Venture	D	None	---	>60	---	Moderate	High	Low.
Rock outcrop.								
158 Whiteman	D	None	---	10-18	Hard	Moderate	High	Moderate.
159*:								
Whiteman	D	None	---	10-18	Hard	Moderate	High	Moderate.
Skutum	C	None	---	50-60	Soft	Moderate	Moderate	Low.
160 Widtsoe	B	None	---	>60	---	Moderate	High	Moderate.
161 Wiggler	D	None	---	8-20	Soft	Moderate	High	Moderate.
162*:								
Wiggler	D	None	---	8-20	Soft	Moderate	High	Moderate.

See footnote at end of table.

TABLE 13.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Months	Depth	Hardness		Uncoated steel	Concrete
				In				
162*:								
Guben------------	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
163*:								
Wiggler----------	D	None-------	---	8-20	Soft	Moderate-----	High-----	Moderate.
Rock outcrop.								
Podo-------------	D	None-------	---	10-20	Hard	Moderate-----	High-----	Moderate.
164--------------- Winetti	B	Rare-------	---	>60	---	Moderate-----	High-----	Low.
165*:								
Winnemucca-------	B	None-------	---	>60	---	Moderate-----	Moderate	Low.
Hoodle-----------	B	None-------	---	>60	---	Moderate-----	High-----	Low.
166, 167, 168----- Yarts	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
169--------------- Yenlo	B	None-------	---	>60	---	Moderate-----	High-----	Low.
170--------------- Zillion	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
171--------------- Zinzer	B	None-------	---	>60	---	Moderate-----	High-----	Moderate.
172--------------- Zyme	D	None-------	---	10-20	Soft	Low----------	High-----	Moderate.
173*:								
Zyme-------------	D	None-------	---	10-20	Soft	Low----------	High-----	Moderate.
Lazear-----------	D	None-------	---	10-20	Hard	Moderate-----	Moderate	Low.
Rock outcrop.								

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ahlstrom	Fine, montmorillonitic, frigid Typic Ustochrepts
Alldown	Fine-loamy, mixed (calcareous), frigid Ustic Torriorthents
Andys	Coarse-loamy, mixed Aridic Calciborolls
Baldfield	Fine, montmorillonitic (calcareous), mesic Ustertic Torriorthents
Barx	Fine-loamy, mixed, mesic Ustollic Haplargids
Bayfield	Fine, mixed (calcareous), mesic Ustertic Torriorthents
Befar	Fine, montmorillonitic (calcareous), mesic Ustertic Torriorthents
Behanin	Loamy-skeletal, mixed Pachic Cryoborolls
Blanchard Family	Mixed, frigid Typic Ustipsamments
Borollic Natrargids	Borollic Natrargids
Broncho	Sandy-skeletal, mixed, mesic Xerollic Camborthids
Bruman	Loamy-skeletal, mixed Borollic Calciorthids
Brycan	Fine-loamy, mixed Cumulic Haploborolls
Bushvalley	Loamy-skeletal, mixed Argic Lithic Cryoborolls
Callings	Clayey-skeletal, montmorillonitic Boralfic Cryoborolls
Cannonville	Clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents
Castino	Clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls
Circleville	Loamy-skeletal, mixed Aridic Argiborolls
Clapper	Loamy-skeletal, mixed, mesic Ustollic Calciorthid
Codley	Fine-silty, carbonatic, frigid Ustic Torriorthents
Comodore	Loamy-skeletal, mixed Lithic Haploborolls
Crestline	Coarse-loamy, mixed, mesic Xerollic Camborthids
Dalcan	Clayey-skeletal, montmorillonitic Pachic Argiborolls
Descot	Coarse-loamy, carbonatic, frigid Ustic Torriorthents
Dimyaw Family	Fine, montmorillonitic (calcareous), frigid Typic Ustorthents
Echard	Fine, mixed Argic Cryoborolls
Ess	Loamy-skeletal, mixed Argic Cryoborolls
Evanston	Fine-loamy, mixed Aridic Argiborolls
Frandsen	Fine-loamy, mixed (calcareous), frigid Typic Ustorthents
Fughes	Fine, montmorillonitic Pachic Argiborolls
Gerst Family	Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthents
Greenhalgh	Fine-silty, mixed (calcareous), frigid Ustic Torrifluvents
Grimm	Sandy-skeletal, mixed, frigid Ustic Torriorthents
Guben	Loamy-skeletal, mixed Typic Calciborolls
Harol	Loamy-skeletal, mixed Typic Argiborolls
Hatch	Fine, montmorillonitic Mollic Cryoboralfs
Henrieville	Coarse-loamy, mixed (calcareous), mesic Ustic Torriorthents
Hernandez Family	Fine-loamy, mixed, mesic Ustollic Calciorthids
Hoodle	Loamy-skeletal, mixed Argic Cryoborolls
Ipson	Loamy-skeletal, mixed Aridic Argiborolls
Jodero	Fine-loamy, mixed Cumulic Haploborolls
Kade	Fine, mixed (calcareous) Typic Cryaquent
Lazear	Loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents
Losee	Loamy-skeletal, mixed Typic Cryochrepts
Luhon	Fine-loamy, mixed Borollic Calciorthids
Mespun	Mixed, mesic Ustic Torripsamments
Mikim	Fine-loamy, mixed (calcareous), mesic Ustic Torriorthents

TABLE 14.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Mitch	Fine-silty, mixed Cumulic Haploborolls
Mivida	Coarse-loamy, mixed, mesic Ustollic Calciorthids
Neto	Coarse-loamy, mixed (calcareous), frigid Typic Ustifluvents
Notter	Fine-loamy, mixed Aridic Argiborolls
Notter Variant	Fine-loamy over sandy or sandy-skeletal, mixed Cumulic Haploborolls
Osote	Fine-loamy, mixed Fluventic Haploborolls
Pahreah	Loamy-skeletal, carbonatic Calcic Cryoborolls
Panguitch	Coarse-loamy, mixed Typic Haploborolls
Paunsaugunt	Loamy-skeletal, mixed Lithic Haploborolls
Plite	Coarse-loamy, mixed Cumulic Haploborolls
Podo	Loamy, mixed (calcareous), frigid Lithic Ustorthents
Quilt	Fine, montmorillonitic Typic Argiborolls
Redcreek	Loamy, mixed (cacareous), frigid Lithic Ustic Torriorthents
Ruko	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
Schauson	Fine-loamy, mixed Pachic Argiborolls
Sevier	Fine, mixed Argic Cryoborolls
Sheege	Loamy-skeletal, carbonatic Cryic Lithic Rendolls
Showalter	Clayey-skeletal, montmorillonitic Typic Argiborolls
Shupert	Fine-loamy, mixed (calcareous), frigid Typic Ustifluvents
Sielo	Fine, kaolinitic Glossic Cryoboralfs
Skutum	Fine, montmorillonitic Argic Pachic Cryoborolls
Swapps	Fine-loamy, mixed Mollic Cryoboralfs
Syrett	Loamy-skeletal, mixed Entic Haploborolls
Tebbs	Coarse-loamy, mixed (calcareous), frigid Ustic Torriorthents
Tica Family	Clayey-skeletal, montmorillonitic Argic Lithic Cryoborolls
Tolman	Loamy-skeletal, mixed Lithic Argiborolls
Tridell	Loamy-skeletal, mixed Aridic Calciborolls
Ustic Torrifluvents	Ustic Torrifluvents
Vanet	Loamy-skeletal, mixed, frigid, shallow Typic Ustochrepts
Venture	Loamy-skeletal, mixed, shallow Aridic Argiborolls
Villy Family	Fine-silty, mixed (calcareous), frigid Typic Fluvaquents
Waltershow	Clayey-skeletal, montmorillonitic Aridic Argiborolls
Whiteman	Loamy-skeletal, mixed Lithic Mollic Cryoboralfs
Widtsoe	Loamy-skeletal, mixed Typic Argiborolls
Wiggler	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Winetti	Loamy-skeletal, mixed (calcareous), frigid Typic Ustifluvents
Winnemucca	Clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls
Yarts	Coarse-loamy, mixed (calcareous), mesic Ustic Torriorthents
Yenlo	Fine-loamy, mixed, mesic Ustollic Haplargids
Zillion	Loamy-skeletal, mixed Pachic Argiborolls
Zinzer	Fine-loamy, mixed Aridic Calciborolls
Zyme	Clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents

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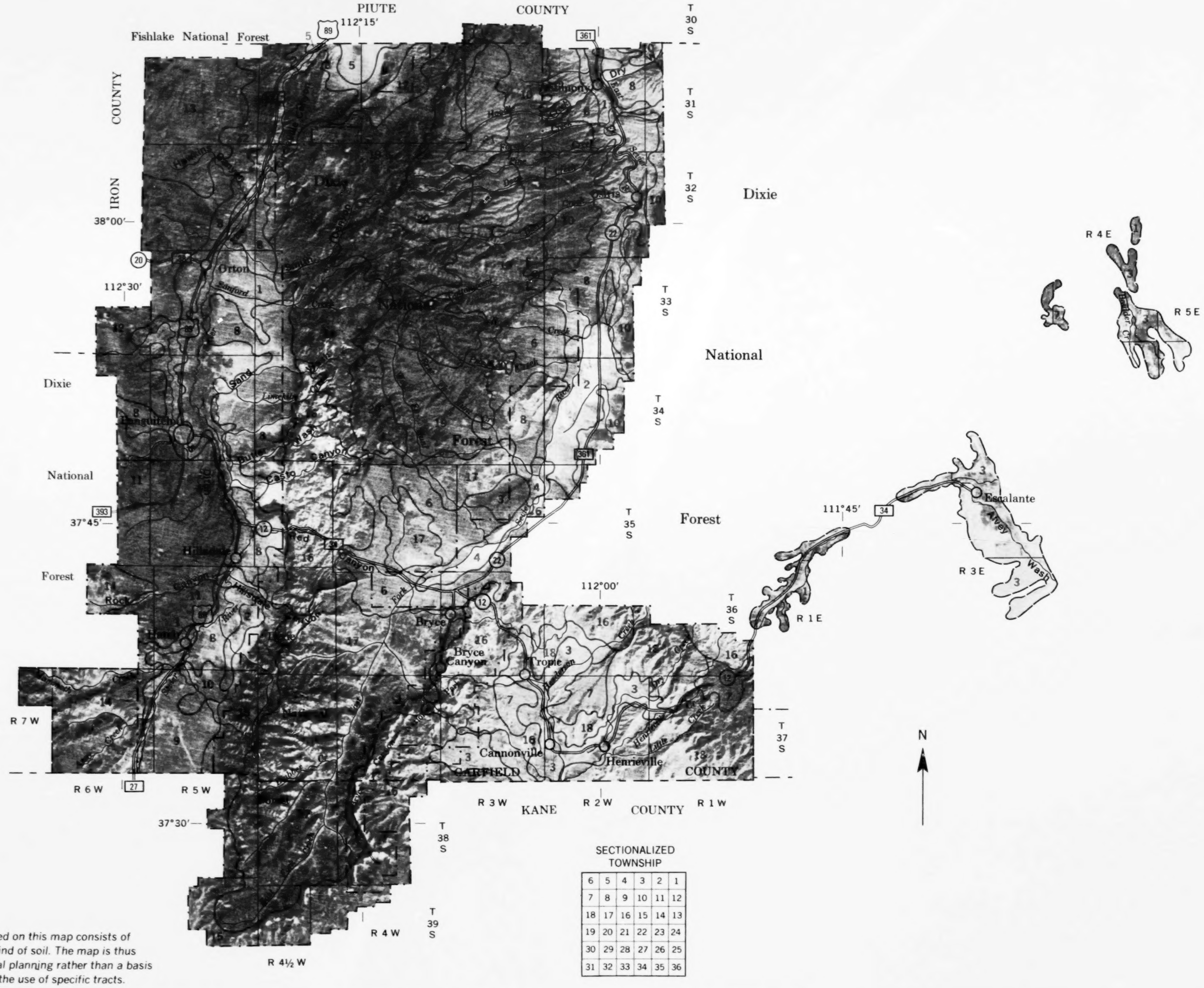
MAPS

TRANSPOSED TO

END OF VOLUME



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

	SOILS MAINLY ON STREAM TERRACES, FANS, FLOOD PLAINS, AND VALLEY PLAINS
1	TEBBS-VILLY FAMILY-ALLDOWN: Very deep, well drained and poorly drained, nearly level to moderately sloping soils; on alluvial fans, flood plains, and valley plains
2	CODLEY-DESCOT-JODERO: Very deep, well drained, nearly level to moderately sloping soils; on alluvial fans and valley plains
3	MIKIM-HENRIEVILLE-BARX: Very deep, well drained, nearly level to moderately sloping soils; on dissected alluvial fans, alluvial terraces, and fan terraces
4	FRANDSEN-PLAYAS: Very deep, well drained, nearly level to strongly sloping soils, and Playas; on valley plains, alluvial fans, flood plains, and valley bottoms
5	CRESTLINE-BRONCHO: Very deep, well drained and somewhat excessively drained, gently sloping to moderately sloping soils; on dissected alluvial fans
	SOILS ON HIGH FANS, TERRACES, BENCHES, PEDIMENTS, MOUNTAINSIDES, AND HILLSIDES
6	SHOWALTER-GUBEN-PANGUITCH: Very deep, well drained, nearly level to moderately steep soils; on dissected alluvial fans, stream terraces, pediments, and mountainsides
7	MIKIM-CLAPPER-YENLO: Very deep, well drained, gently sloping to steep soils; on fan terraces, mountainsides, and benches
8	NOTTER-BRUMAN-TRIDELL: Very deep, well drained, gently sloping to moderately steep soils; on alluvial fans, hillsides, mountainsides, and fan terraces
9	ZINZER-LUHON-TRIDELL: Very deep, well drained, gently sloping to moderately steep soils; on alluvial fans, fan terraces, and mountainsides
	SOILS MAINLY ON HILLSIDES, LOW MOUNTAINS, ALLUVIAL FANS, FAN TERRACES, BENCHES, AND RIDGES
10	IPSON-TRIDELL: Very deep, well drained, moderately sloping to steep soils; on alluvial fans, mountainsides, hillsides, and fan terraces
11	WALTERSHOW-QUILT-VENTURE: Very deep and shallow, well drained, gently sloping to steep soils; on mountainsides, low hills, ridges, benches, and dissected alluvial fans
12	TOLMAN-COMODORE-WALTERSHOW: Shallow and very deep, well drained, strongly sloping to steep soils; on mountainsides and ridges
13	HAROL-DALCAN-BUSHVALLEY: Shallow, moderately deep and very deep, well drained and somewhat excessively drained, gently sloping to steep soils; on mountainsides, alluvial fans, and benches
14	WIGGLER-GUBEN-QUILT: Shallow and very deep, well drained, gently sloping to very steep soils; on alluvial fans, mountainsides, low hills, pediments, and benches
	SOILS ON PLATEAUS FORMED IN SEDIMENTARY ROCK
15	RUKO-ROCK OUTCROP-SWAPPS: Shallow and moderately deep, well drained, moderately sloping to very steep soils, and Rock outcrop; on mountainsides, mesas, and hillsides
16	BADLAND-ROCK OUTCROP: Steep and very steep, strongly dissected areas; on plateau side slopes
17	PAHREAH-SYRETT-BADLAND: Moderately deep, well drained and somewhat excessively drained, gently sloping to very steep soils, and Badland; on mesa side slopes, hillsides, mountainsides, and benches
18	PODO-CANNONVILLE-ROCK OUTCROP: Shallow, well drained and somewhat excessively drained, strongly sloping to very steep soils, and Rock outcrop; on ridges, hills, mountainsides, and benches
	SOILS FORMED IN IGNEOUS MATERIAL ON HIGH MOUNTAINS
19	CASTINO-ROCK OUTCROP-CIRCLEVILLE: Moderately deep, well drained, moderately sloping to steep soils, and Rock outcrop; on hillsides and mountainsides
20	CALLINGS-BEHANIN-CASTINO: Moderately deep and very deep, well drained, moderately sloping to very steep soils; on hillsides, mountains, and ridges
21	WINNEMUCCA-HOODLE: Very deep, well drained, moderately sloping soils; on dissected pediments and in mountain meadows

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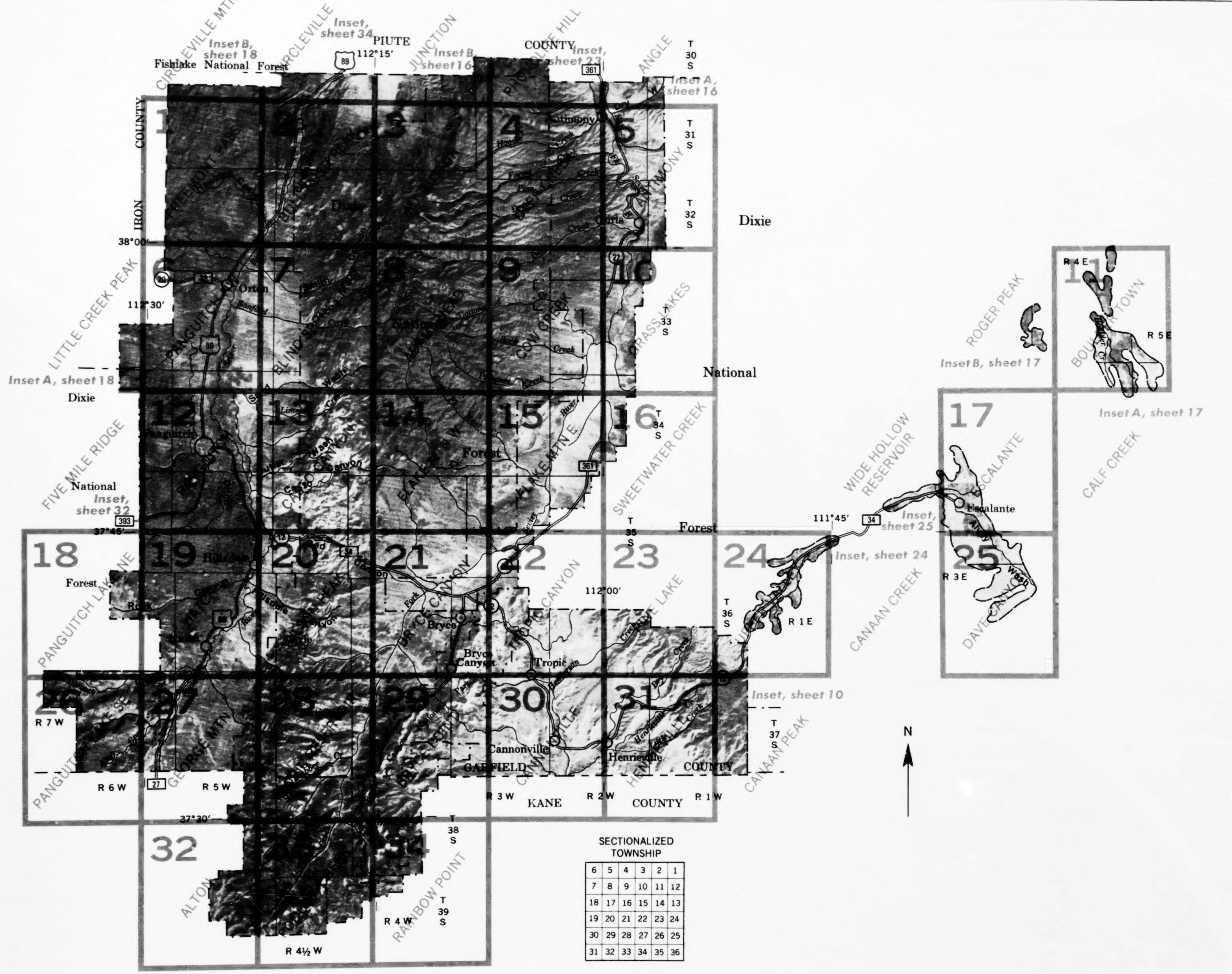
SOIL CONSERVATION SERVICE
FOREST SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NATIONAL PARK SERVICE
UTAH AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

PANGUITCH AREA, UTAH
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES

Scale 1:380,160
1 0 1 2 3 4 5 6 Miles
1 0 5 10 Km



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
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31	32	33	34	35	36

INDEX TO MAP SHEETS

PANGUITCH AREA, UTAH
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles

1 0 5 10 Km

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE AND FOREST SERVICE

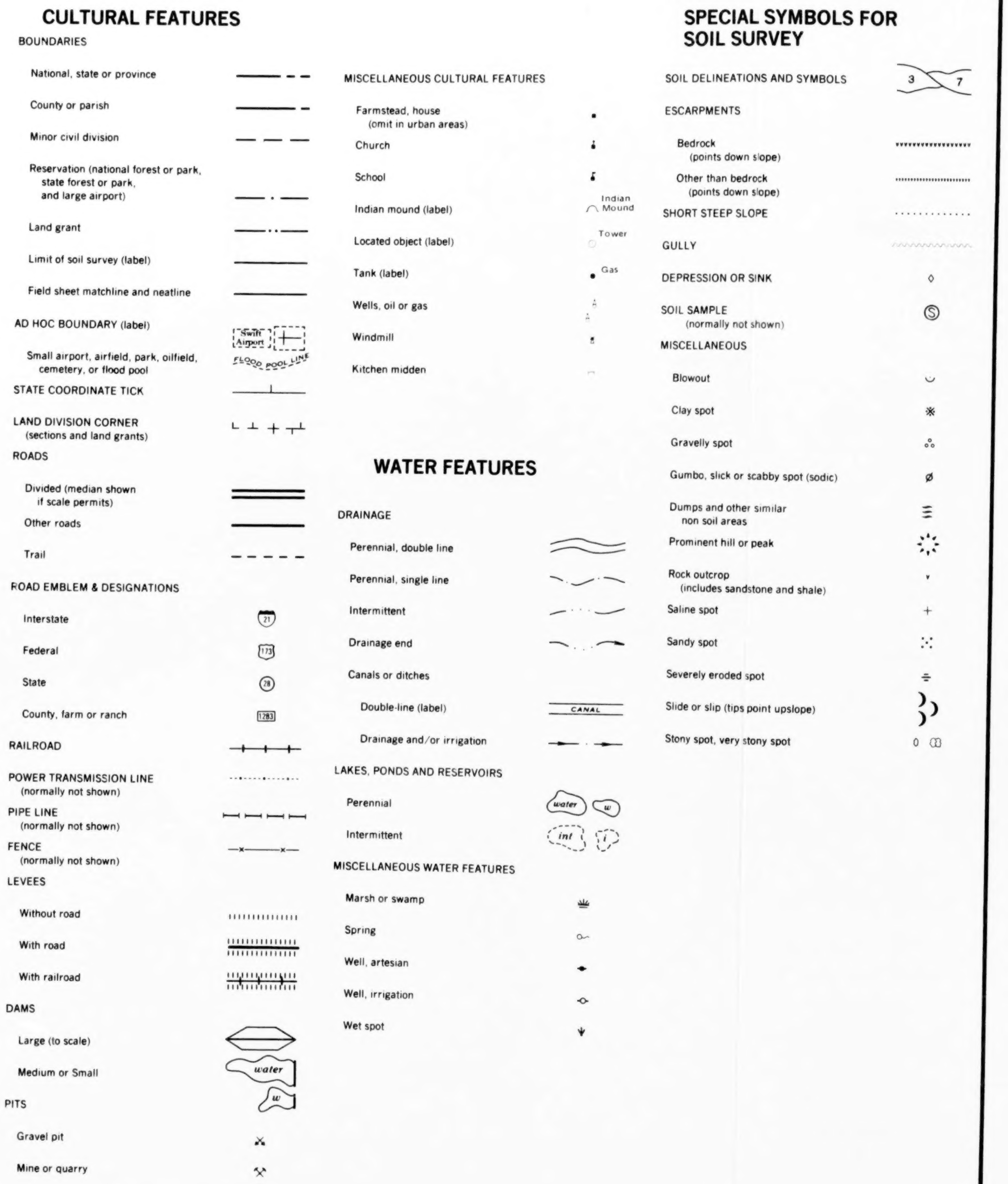
PANGUITCH AREA, UTAH
PARTS OF GARFIELD, IRON, KANE, AND PIUTE COUNTIES

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NATIONAL PARK SERVICE
UTAH AGRICULTURAL EXPERIMENT STATION

SOIL LEGEND

SYMBOL	NAME
1	Ahlstrom-Osote complex, 1 to 15 percent slopes
2	Alldown clay loam, 1 to 2 percent slopes
3	Alldown clay loam, 2 to 5 percent slopes
4	Alldown loam, alkali, 1 to 2 percent slopes
5	Alldown clay loam, moist, 2 to 5 percent slopes
6	Andys loam, 2 to 15 percent slopes
7	Andys very cobbly loam, 8 to 25 percent slopes
8	Badland-Cannonville-Rock outcrop complex, 30 to 50 percent slopes
9	Badland-Rock outcrop-Paunsaugunt complex, 2 to 20 percent slopes
10	Baldfield clay, 2 to 4 percent slopes
11	Baldfield clay, 2 to 8 percent slopes, eroded
12	Barx fine sandy loam, 2 to 10 percent slopes
13	Bayfield clay, 2 to 8 percent slopes
14	Befar clay, 4 to 8 percent slopes
15	Behanin loam, 30 to 70 percent slopes
16	**Blanchard Family sand, 30 to 70 percent slopes**
17	Borollic Natrargids, 0 to 1 percent slopes
18	Broncho very gravelly sandy loam, 2 to 5 percent slopes
19	Bruman loam, 2 to 5 percent slopes
20	Bruman gravelly loam, 2 to 10 percent slopes
21	Bruman cobbly loam, moist, 10 to 30 percent slopes
22	Bruman cobbly loam, moist, 30 to 50 percent slopes
23	Bruman very cobbly loam, 5 to 30 percent slopes
24	Bruman very cobbly loam, 30 to 50 percent slopes
25	Brycan very fine sandy loam, 1 to 6 percent slopes
26	Brycan very fine sandy loam, 6 to 15 percent slopes
27	Bushvalley very stony loam, 15 to 40 percent slopes
28	Callings-Winnemucca association, 5 to 15 percent slopes
29	Cannonville clay, 30 to 50 percent slopes
30	Cannonville very stony clay, 30 to 50 percent slopes
31	Castino-Behanin association, 20 to 70 percent slopes
32	**Castino-Tica Family complex, 20 to 70 percent slopes**
33	Castino-Winnemucca association, 5 to 30 percent slopes
34	Circleville-Rock outcrop complex, 25 to 60 percent slopes
35	Clapper cobbly loam, 5 to 30 percent slopes
36	Clapper cobbly loam, 30 to 60 percent slopes
37	Codley silt loam, 1 to 2 percent slopes
38	Codley silt loam, 2 to 5 percent slopes
39	Comodore-Rock outcrop complex, 15 to 40 percent slopes
40	Crestline fine sandy loam, 2 to 4 percent slopes
41	Dalcan very cobbly loam, dry, 4 to 25 percent slopes
42	Descot silt loam, dry, 1 to 2 percent slopes
43	Descot silt loam, 2 to 5 percent slopes
44	**Dimyaw Family, gravelly loam, 4 to 25 percent slopes, eroded**
45	Echard loam, 5 to 30 percent slopes
46	Ess-Callings association, 15 to 45 percent slopes
47	Evanston loam, 2 to 8 percent slopes
48	Evanston very cobbly loam, 4 to 25 percent slopes
49	Frandsen loam, dry, 1 to 15 percent slopes
50	Frandsen-Neto association, 1 to 8 percent slopes
51	Frandsen, dry-Wiggler complex, 15 to 50 percent slopes
52	Fughes silty clay loam, 0 to 4 percent slopes
53	**Gerst Family-Rock outcrop complex, 20 to 70 percent slopes**
54	Greenhalgh silt loam, 1 to 2 percent slopes
55	Greenhalgh silt loam, 2 to 5 percent slopes
56	Grimm sandy loam, 1 to 5 percent slopes
57	Guben gravelly loam, dry, 1 to 25 percent slopes
58	Guben-Showalter complex, 2 to 30 percent slopes
59	Harol very cobbly loam, 2 to 15 percent slopes
60	Harol very cobbly loam, 15 to 40 percent slopes
61	Harol very cobbly loam, moist, 25 to 50 percent slopes
62	Hatch-Pahreah complex, 5 to 25 percent slopes
63	Hatch-Swapps complex, 5 to 25 percent slopes
64	Henrieville sandy loam, 1 to 2 percent slopes
65	Henrieville sandy loam, 2 to 5 percent slopes
66	Henrieville sandy loam, 5 to 10 percent slopes
67	Henrieville sandy loam, moist, 2 to 8 percent slopes
68	**Hernandez Family-Clapper complex, 2 to 8 percent slopes**
69	Ipson cobbly loam, 8 to 25 percent slopes
70	Ipson very cobbly loam, 25 to 60 percent slopes
71	Ipson very stony loam, dry, 5 to 25 percent slopes
72	Jodero loam, 1 to 2 percent slopes
73	Jodero loam, moist, 2 to 8 percent slopes
74	Kade silt loam, 0 to 2 percent slopes
75	Lava flows
76	Lazear-Rock outcrop-Badland complex, 8 to 20 percent slopes
77	Losee gravelly loam, 3 to 15 percent slopes
78	Losee gravelly sandy loam, dry, 10 to 25 percent slopes
79	Losee very gravelly loam, 30 to 60 percent slopes
80	Luhon loam, 2 to 5 percent slopes
81	Luhon loam, gravelly substratum, 1 to 2 percent slopes
82	Luhon loam, gravelly substratum, 2 to 5 percent slopes
83	Luhon loam, moist, 3 to 15 percent slopes
84	Luhon very cobbly sandy loam, 2 to 15 percent slopes
85	Mespun loamy fine sand, 1 to 3 percent slopes
86	Mespun loamy fine sand, 3 to 8 percent slopes
87	Mespun loamy fine sand, 8 to 15 percent slopes
88	Mikim sandy loam, 2 to 8 percent slopes
89	Mikim loam, dry, 1 to 2 percent slopes
90	Mikim loam, 2 to 4 percent slopes
91	Mikim clay loam, dry, 1 to 2 percent slopes
92	Mikim clay loam, dry, 2 to 5 percent slopes
93	Mitch silt loam, 0 to 3 percent slopes
94	Mitch-Riverwash association, 0 to 3 percent slopes
95	Mivida fine sandy loam, 2 to 10 percent slopes
96	Neto fine sandy loam, 1 to 5 percent slopes
97	Neto very fine sandy loam, wet, 0 to 2 percent slopes
98	Notter loam, 1 to 4 percent slopes
99	Notter loam, moist, 1 to 8 percent slopes
100	Notter loam, thick surface, 4 to 8 percent slopes
101	Notter gravelly coarse sandy loam, 2 to 8 percent slopes
102	Notter gravelly loam, 8 to 25 percent slopes
103	Notter very cobbly loam, 4 to 25 percent slopes
104	Notter Variant loam, 1 to 4 percent slopes
105	Pahreah-Sheege complex, 1 to 20 percent slopes
106	Pahreah-Sielo complex, 2 to 25 percent slopes
107	Pahreah-Swapps complex, 25 to 65 percent slopes
108	Panguitch-Mitch association, 0 to 5 percent slopes
109	Panguitch-Riverwash association, 5 to 15 percent slopes
110	Paunsaugunt gravelly loam, 2 to 15 percent slopes
111	Paunsaugunt-Syrett gravelly loams, 2 to 20 percent slopes
112	Playas
113	Plite sandy loam, 2 to 8 percent slopes
114	Podo loamy sand, 1 to 12 percent slopes
115	Podo-Wiggler complex, 10 to 50 percent slopes
116	Podo-Rock outcrop complex, 10 to 40 percent slopes
117	Quilt very cobbly loam, 4 to 25 percent slopes
118	Quilt very cobbly loam, 25 to 40 percent slopes
119	Redcreek gravelly sandy loam, dry, 10 to 40 percent slopes
120	Redcreek cobbly loam, 15 to 50 percent slopes
121	Riverwash
122	Rock outcrop
123	Rock outcrop-Podo complex, 40 to 70 percent slopes
124	Rubble land
125	Ruko clay loam, 30 to 60 percent slopes
126	Ruko-Podo complex, 15 to 60 percent slopes
127	Schauson loam, 2 to 4 percent slopes
128	Schauson loam, 4 to 15 percent slopes
129	Sevier-Skutum association, 5 to 35 percent slopes
130	Sheege-Swapps complex, 30 to 50 percent slopes
131	Showalter-Guben complex, dry, 0 to 8 percent slopes
132	Shupert silty clay loam, wet, 0 to 1 percent slopes
133	Sielo very fine sandy loam, 2 to 12 percent slopes
134	Skutum very fine sandy loam, 1 to 6 percent slopes
135	Skutum fine sandy loam, 10 to 35 percent slopes
136	Swapps gravelly loam, 5 to 25 percent slopes
137	Swapps gravelly loam, 25 to 65 percent slopes
138	Syrett gravelly loam, 2 to 12 percent slopes
139	Syrett-Frandsen association, 1 to 12 percent slopes
140	Syrett-Vanet gravelly loams, 20 to 40 percent slopes
141	Tebbs sandy loam, 2 to 5 percent slopes
142	Tebbs loam, 1 to 2 percent slopes
143	Tebbs loam, moist, 1 to 2 percent slopes
144	Tolman very cobbly silt loam, 8 to 35 percent slopes
145	Tolman-Rock outcrop complex, 25 to 40 percent slopes
146	Tridell loam, 2 to 4 percent slopes
147	Tridell gravelly loam, moist, 4 to 25 percent slopes
148	Tridell cobbly loam, 4 to 25 percent slopes
149	Tridell, moist-Rock outcrop complex, 25 to 50 percent slopes
150	Ustic Torrifluvents, occasionally flooded, 2 to 8 percent slopes
151	Venture cobbly loam, 4 to 30 percent slopes
152	Venture very cobbly silt loam, 4 to 25 percent slopes
153	Venture cobbly loam, dry, 8 to 25 percent slopes
154	**Villy Family silty clay loam, 0 to 2 percent slopes**
155	Waltershow extremely cobbly loam, 8 to 40 percent slopes
156	Waltershow extremely cobbly loam, 40 to 60 percent slopes
157	Waltershow-Venture-Rock outcrop complex, 4 to 40 percent slopes
158	Whiteman very cobbly very fine sandy loam, 1 to 6 percent slopes
159	Whiteman-Skutum association, 10 to 70 percent slopes
160	Widtsoe gravelly sandy loam, 8 to 40 percent slopes
161	Wiggler channery loam, 20 to 50 percent slopes
162	Wiggler-Guben complex, 25 to 50 percent slopes
163	Wiggler-Rock outcrop-Podo complex, 50 to 70 percent slopes
164	Winetti gravelly sandy loam, 2 to 7 percent slopes
165	Winnemucca-Hoodle association, 5 to 30 percent slopes
166	Yarts loam, 1 to 2 percent slopes
167	Yarts sandy loam, 2 to 5 percent slopes
168	Yarts sandy loam, 5 to 10 percent slopes
169	Yenlo loam, 2 to 8 percent slopes
170	Zillion very cobbly loam, 5 to 25 percent slopes
171	Zinzer loam, 3 to 15 percent slopes
172	Zyme very cobbly loam, 30 to 60 percent slopes
173	Zyme-Lazear-Rock outcrop complex, 8 to 60 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND



CULTURAL FEATURES

BOUNDARIES

National, state or province

County or parish

Minor civil division

Reservation (national forest or park, state forest or park, and large airport)

Land grant

Limit of soil survey (label)

Field sheet matchline and neatline

AD HOC BOUNDARY (label)

Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

Divided (median shown if scale permits)

Other roads

Trail

ROAD EMBLEM & DESIGNATIONS

Interstate

Federal

State

County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

Without road

With road

With railroad

DAMS

Large (to scale)

Medium or Small

PITS

Gravel pit

Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

Farmstead, house (omit in urban areas)

Church

School

Indian mound (label)

Located object (label)

Tank (label)

Wells, oil or gas

Windmill

Kitchen midden

WATER FEATURES

DRAINAGE

Perennial, double line

Perennial, single line

Intermittent

Drainage end

Canals or ditches

Double-line (label)

Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

Perennial

Intermittent

MISCELLANEOUS WATER FEATURES

Marsh or swamp

Spring

Well, artesian

Well, irrigation

Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

Bedrock (points down slope)

Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS

Blowout

Clay spot

Gravelly spot

Gumbo, slick or scabby spot (sodic)

Dumps and other similar non soil areas

Prominent hill or peak

Rock outcrop (includes sandstone and shale)

Saline spot

Sandy spot

Severely eroded spot

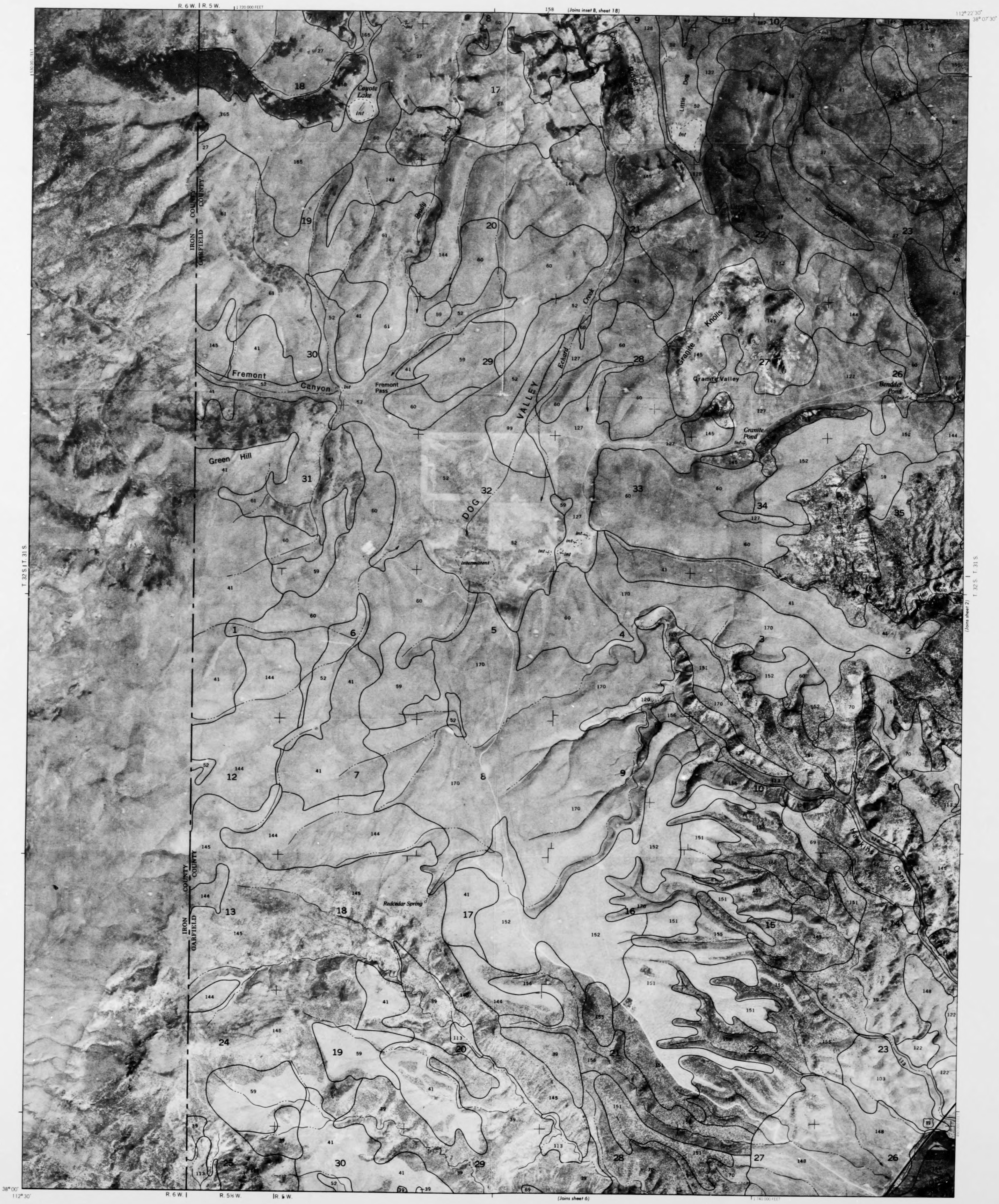
Slide or slip (tips point upslope)

Stony spot, very stony spot

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 1
SOIL SURVEY OF PANGUITCH AREA, UTAH, PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

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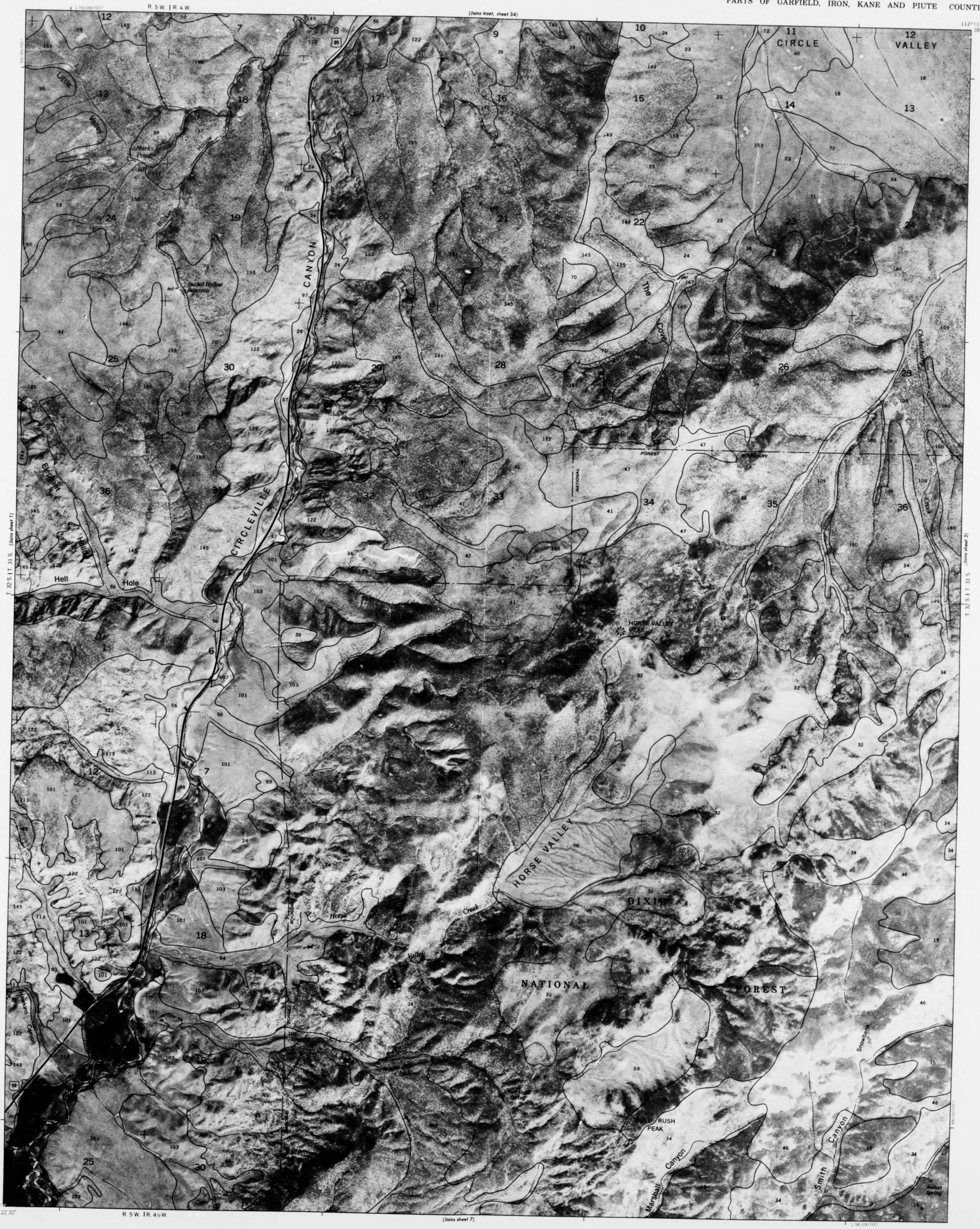
PANGUITCH AREA, UTAH NO. 1

A57. 38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 2
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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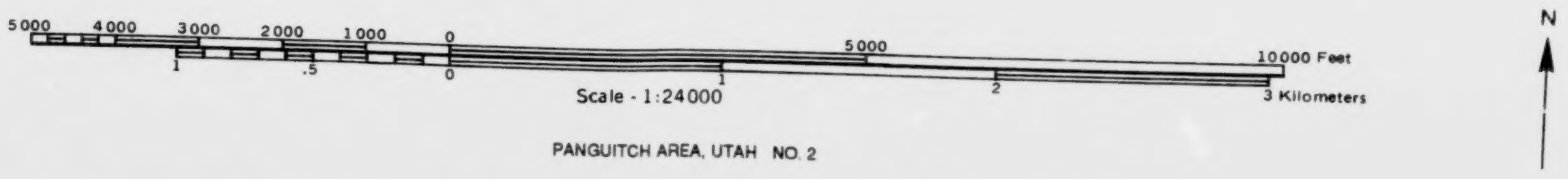

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PANGUITCH AREA, UTAH NO. 2

SHEET NO. 2 OF 34

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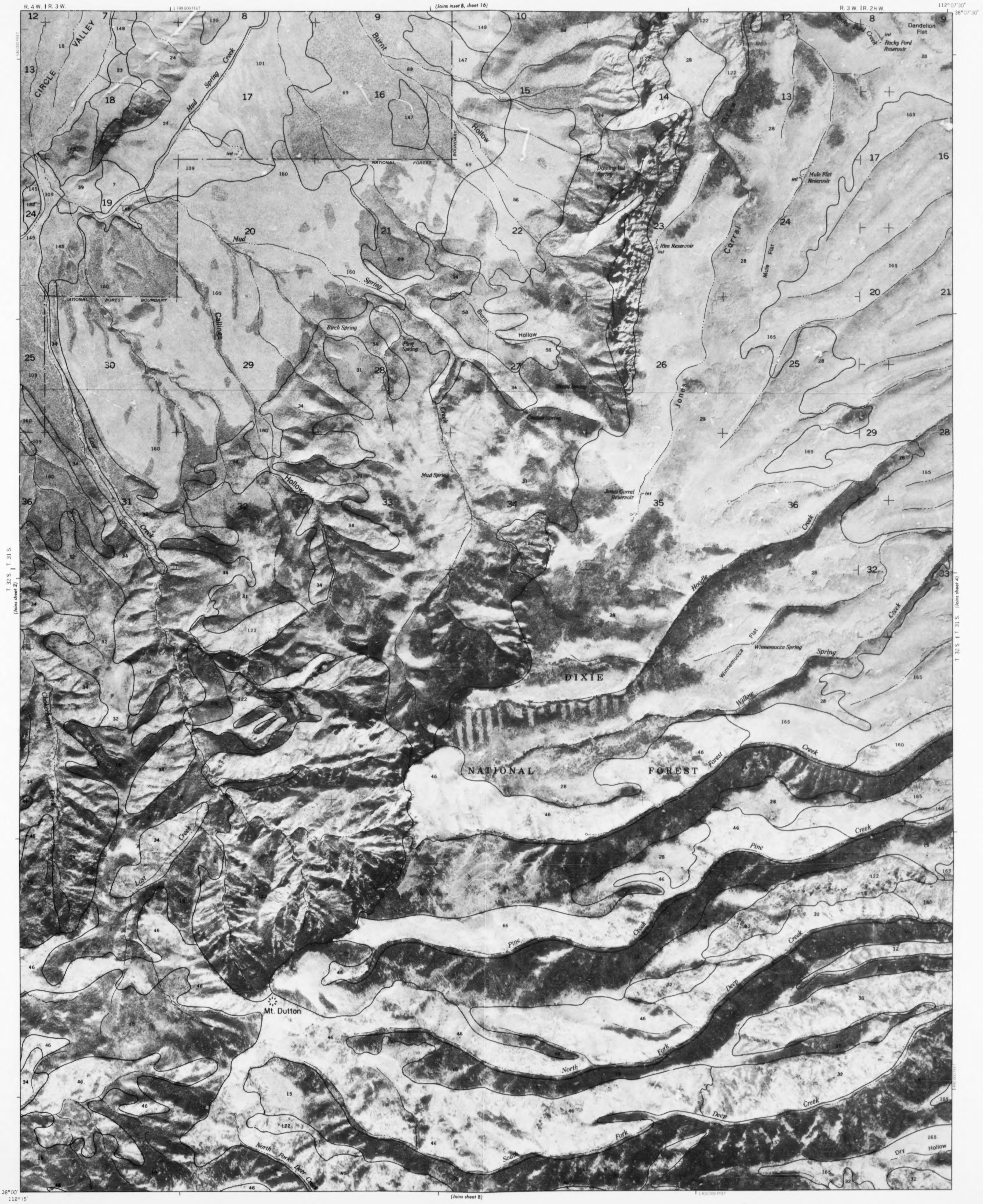
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 3
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N

PANGUITCH AREA, UTAH NO. 3

SHEET NO. 3 OF 34

A 57.38:

P 19/4

United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department
of Agriculture, Forest
Service; United States
Department of the
Interior, Bureau of Land
Management and
National Park Service;
and Utah Agricultural
Experiment Station

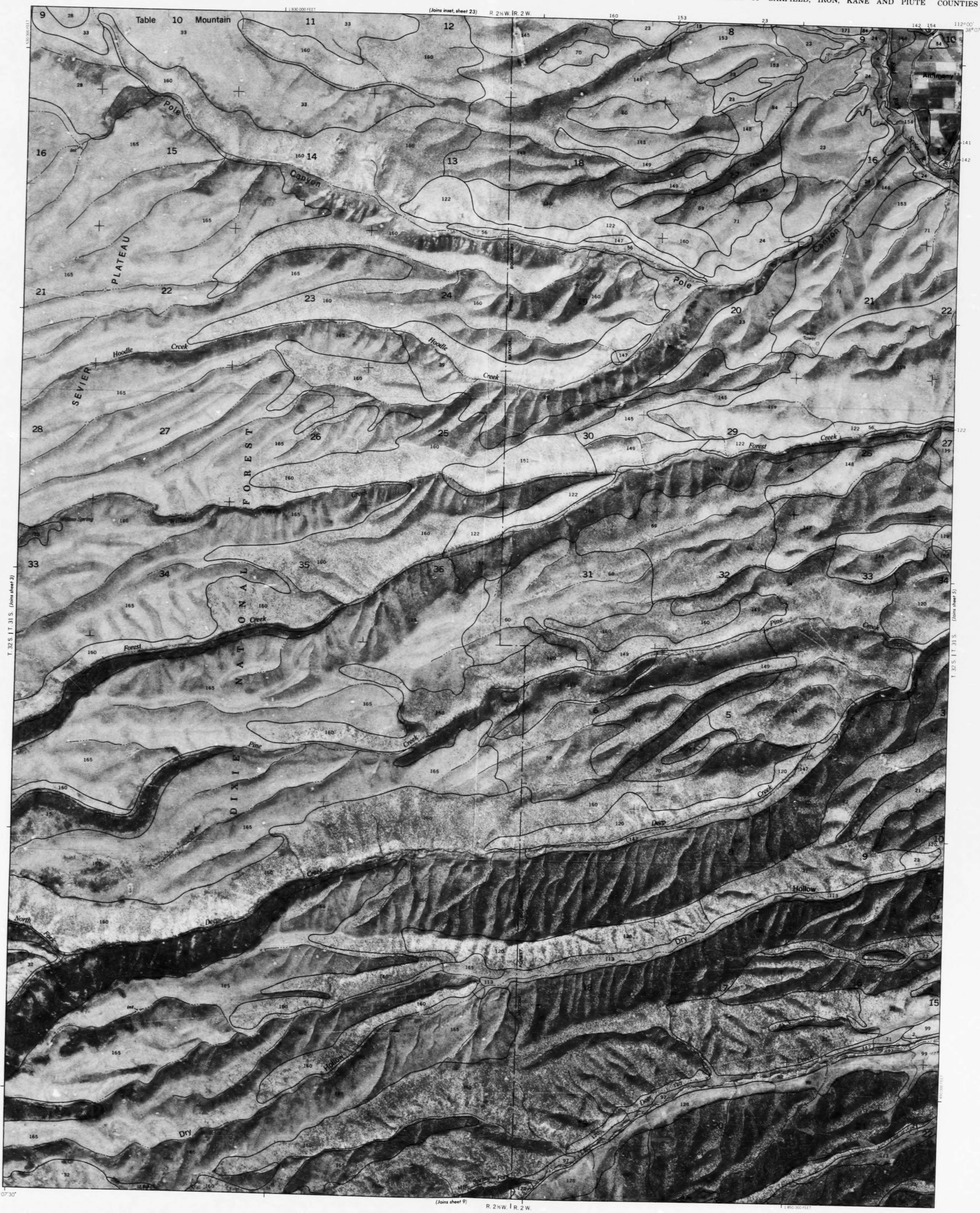
Soil Survey of Panguitch Area, Utah

Parts of Garfield, Iron, Kane, and Piute Counties

A 57

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 4
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

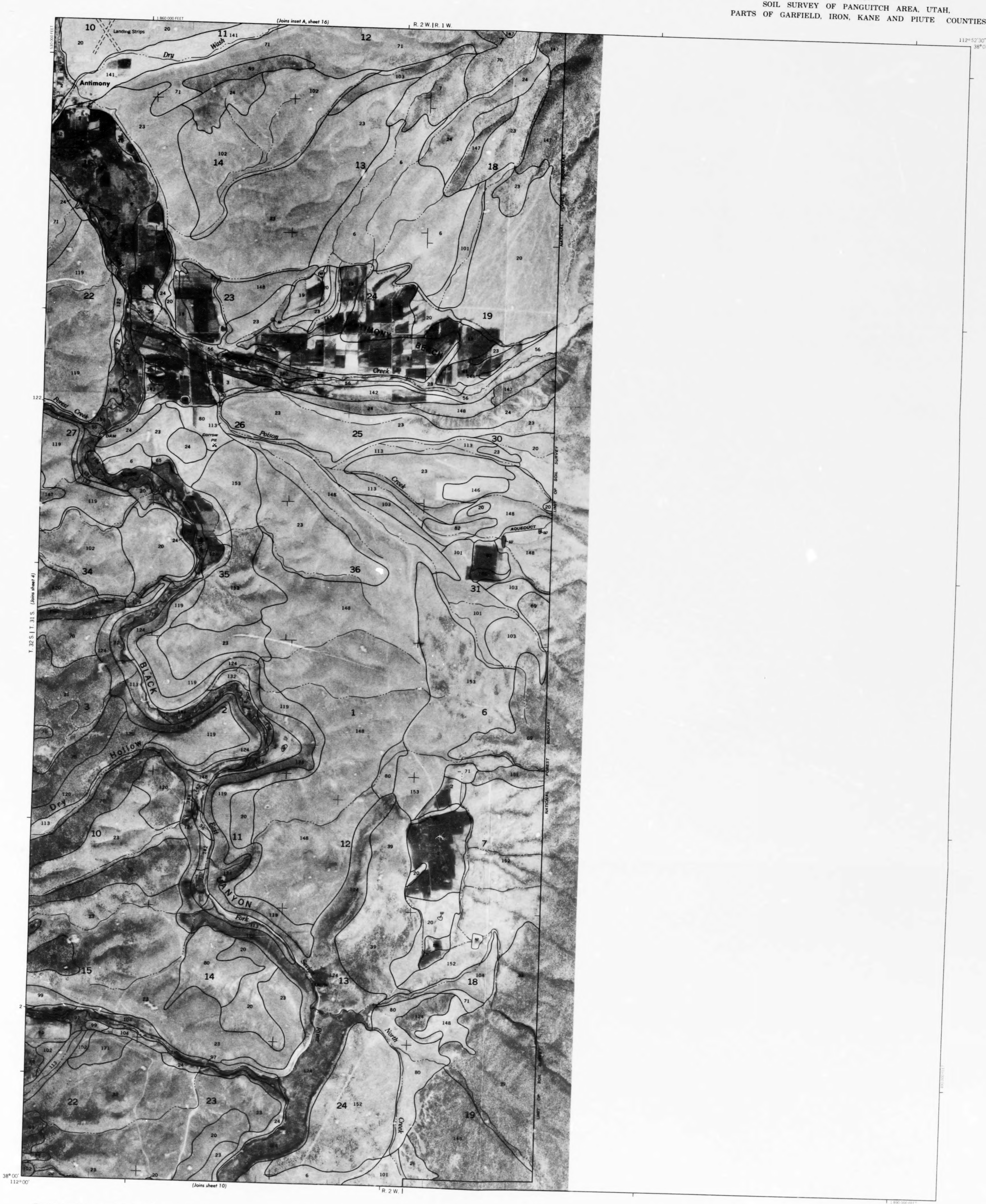
PANGUITCH AREA, UTAH NO. 4

SHEET NO. 4 OF 34

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 5
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

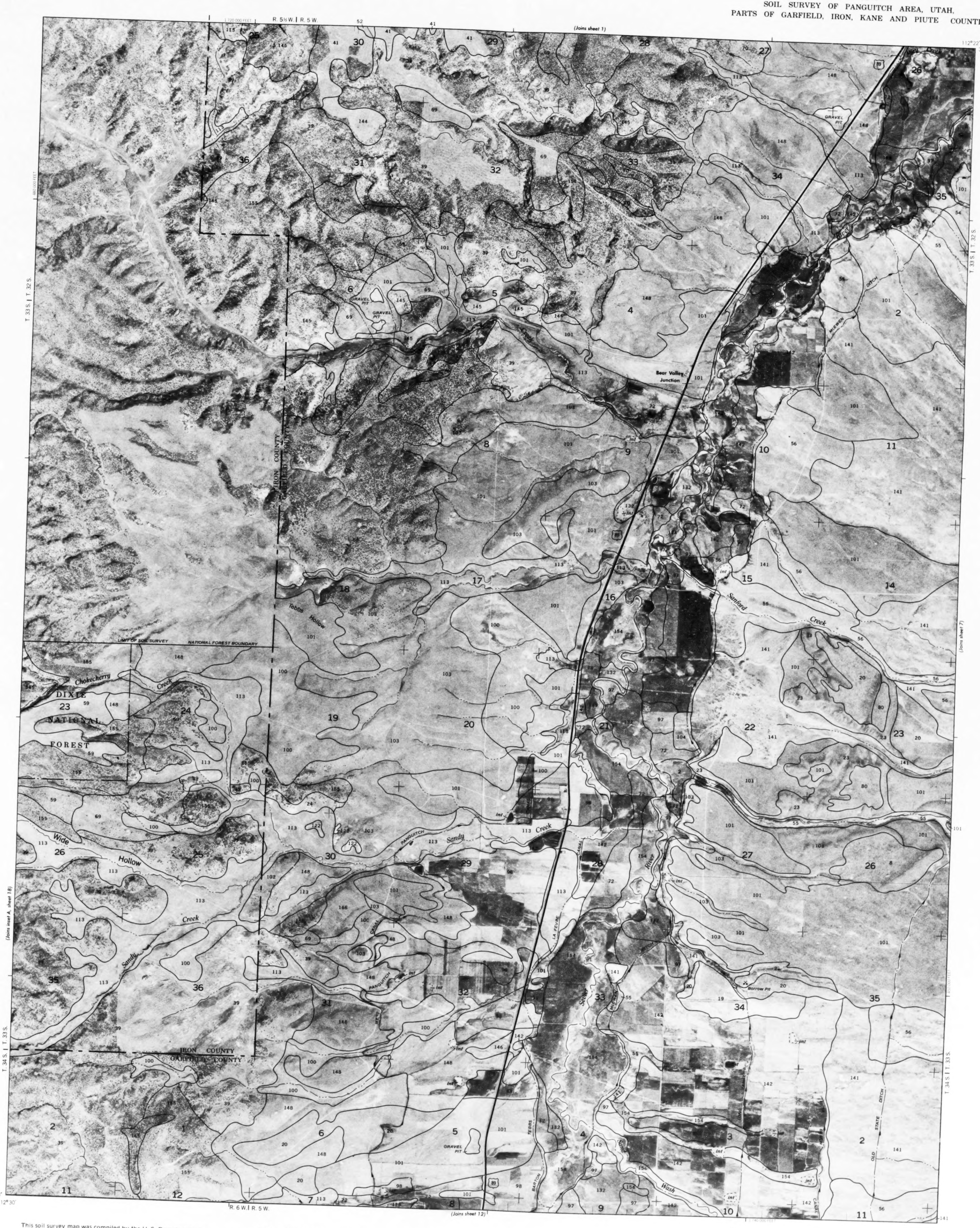
N

PANGUITCH AREA, UTAH NO. 5

A 57.38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 6
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

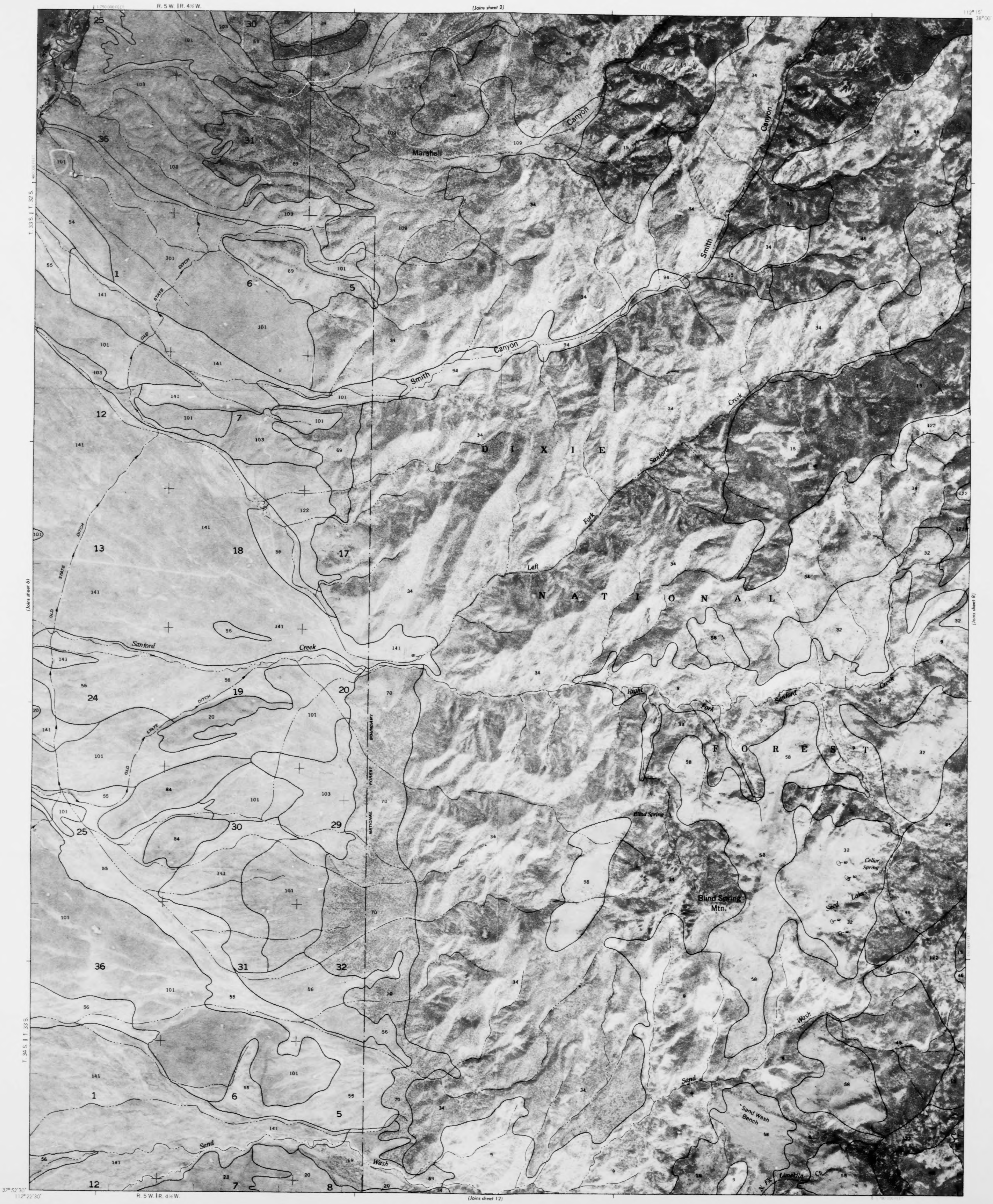
N

PANGUITCH AREA, UTAH NO. 6

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 7
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

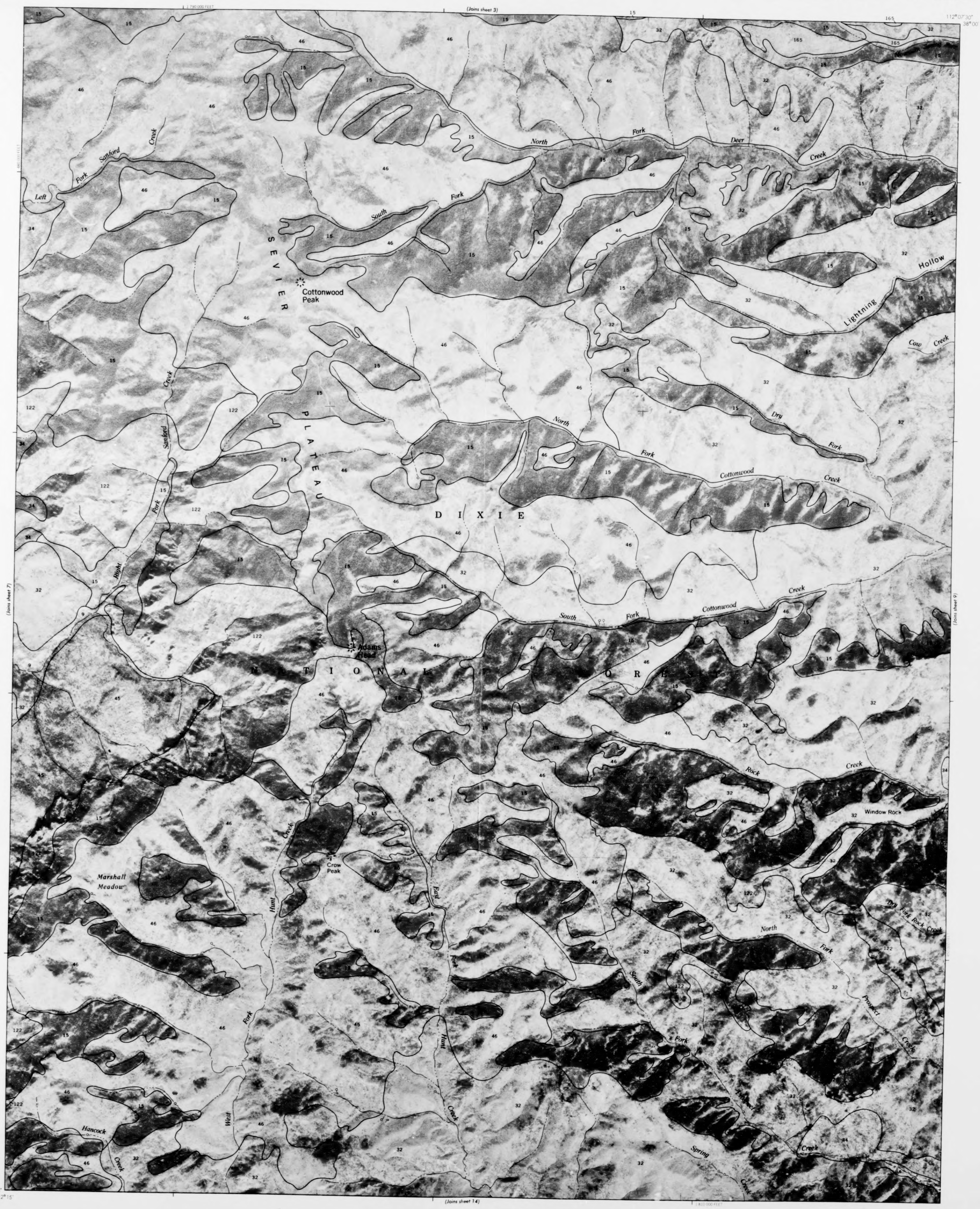
N

PANGUITCH AREA, UTAH NO. 7

A 57.38

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 8
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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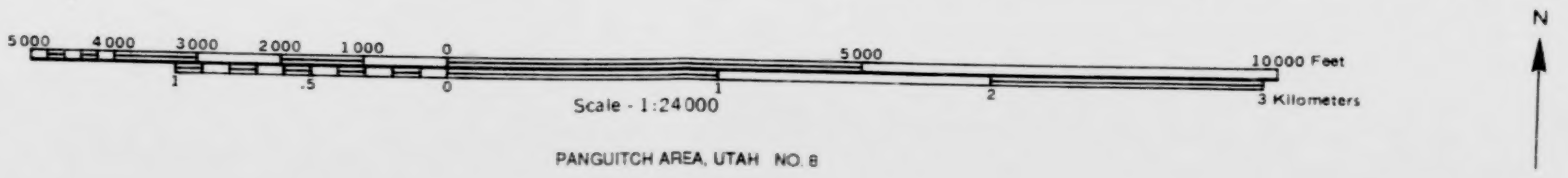


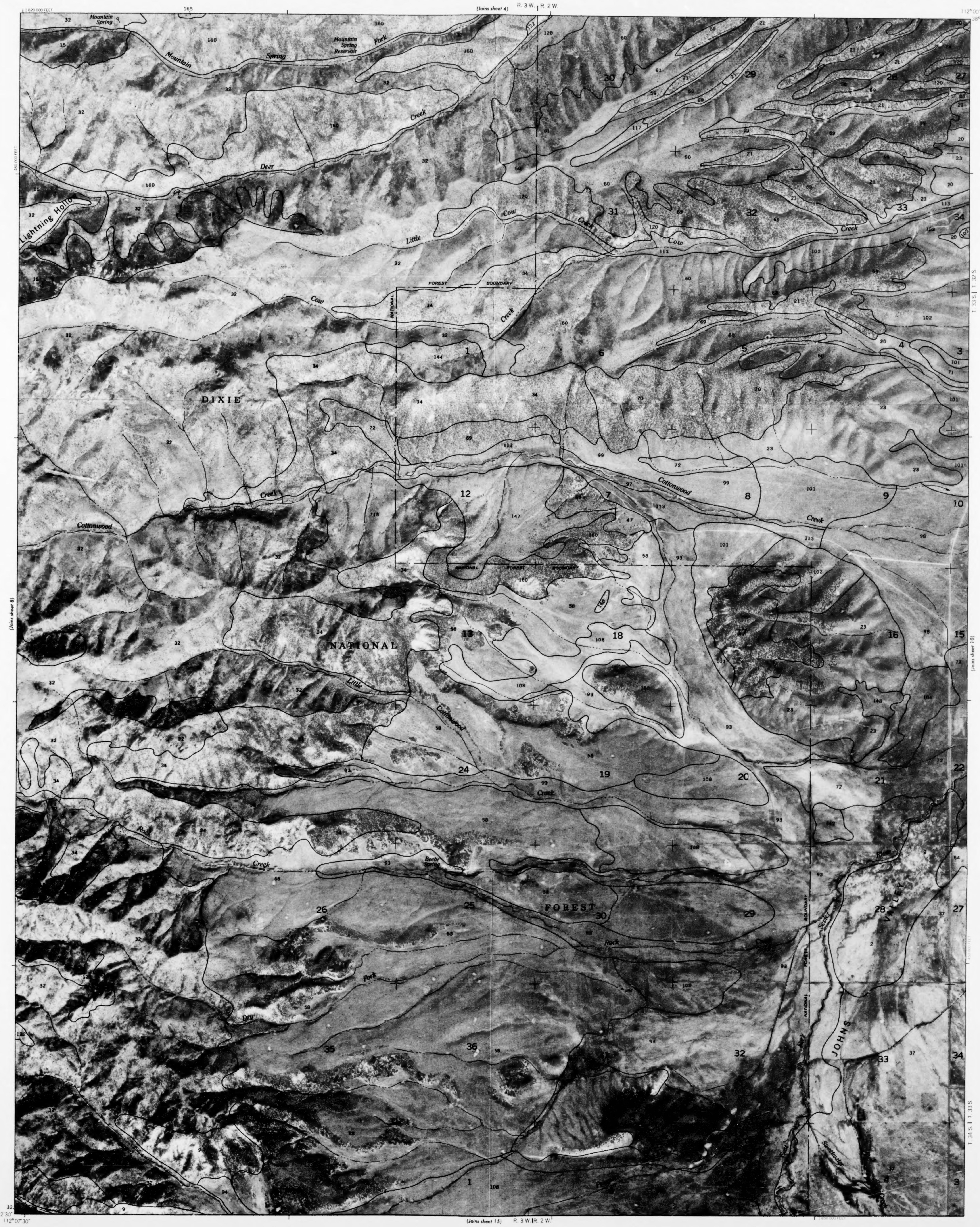
Scale - 1:24000

PANGUITCH AREA, UTAH NO. 8

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 9
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

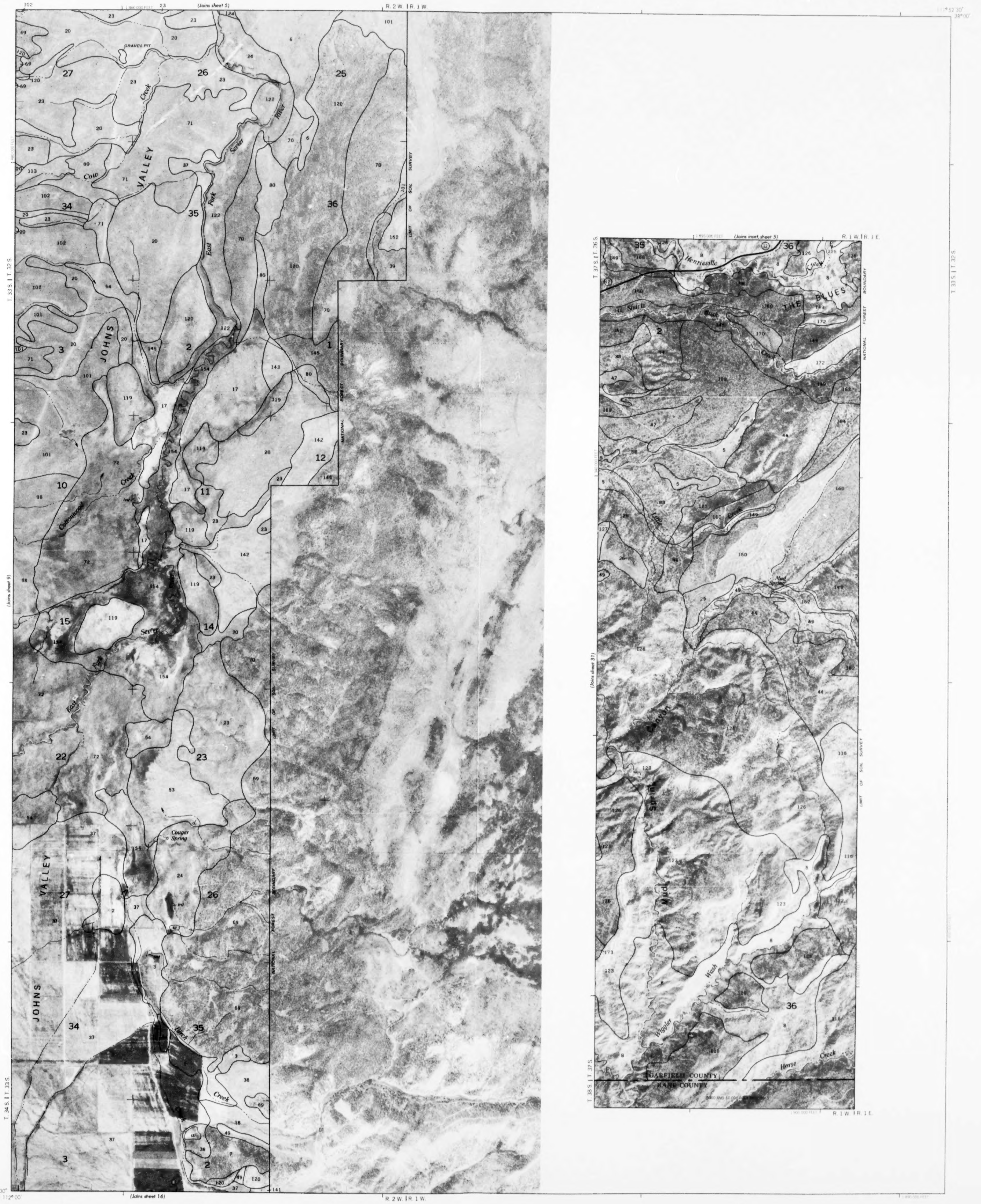
PANGUITCH AREA, UTAH NO. 9

A57. 38:

SHEET NO. 9 OF 34

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 10
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

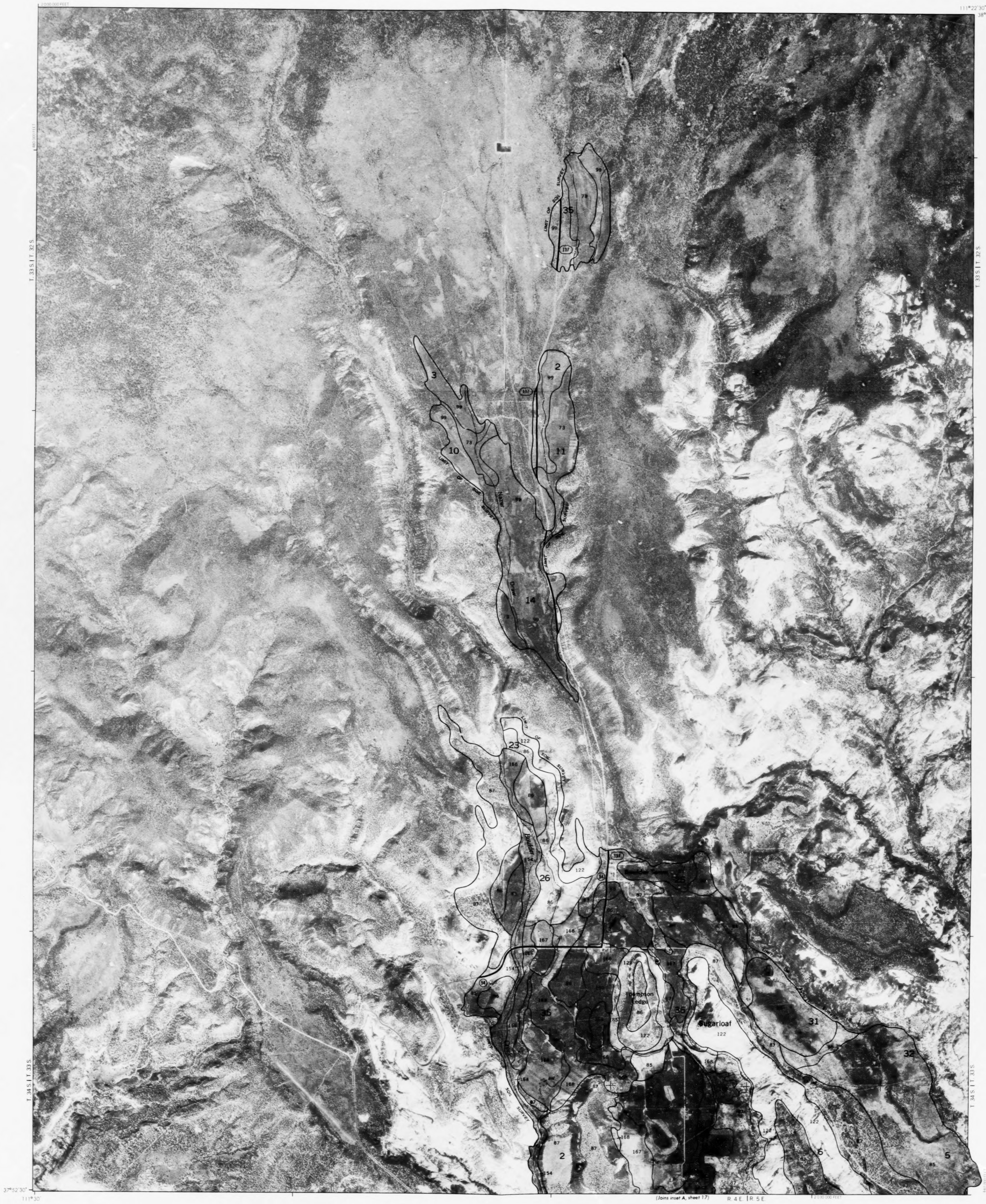
N

PANGUITCH AREA, UTAH NO. 10

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 11
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

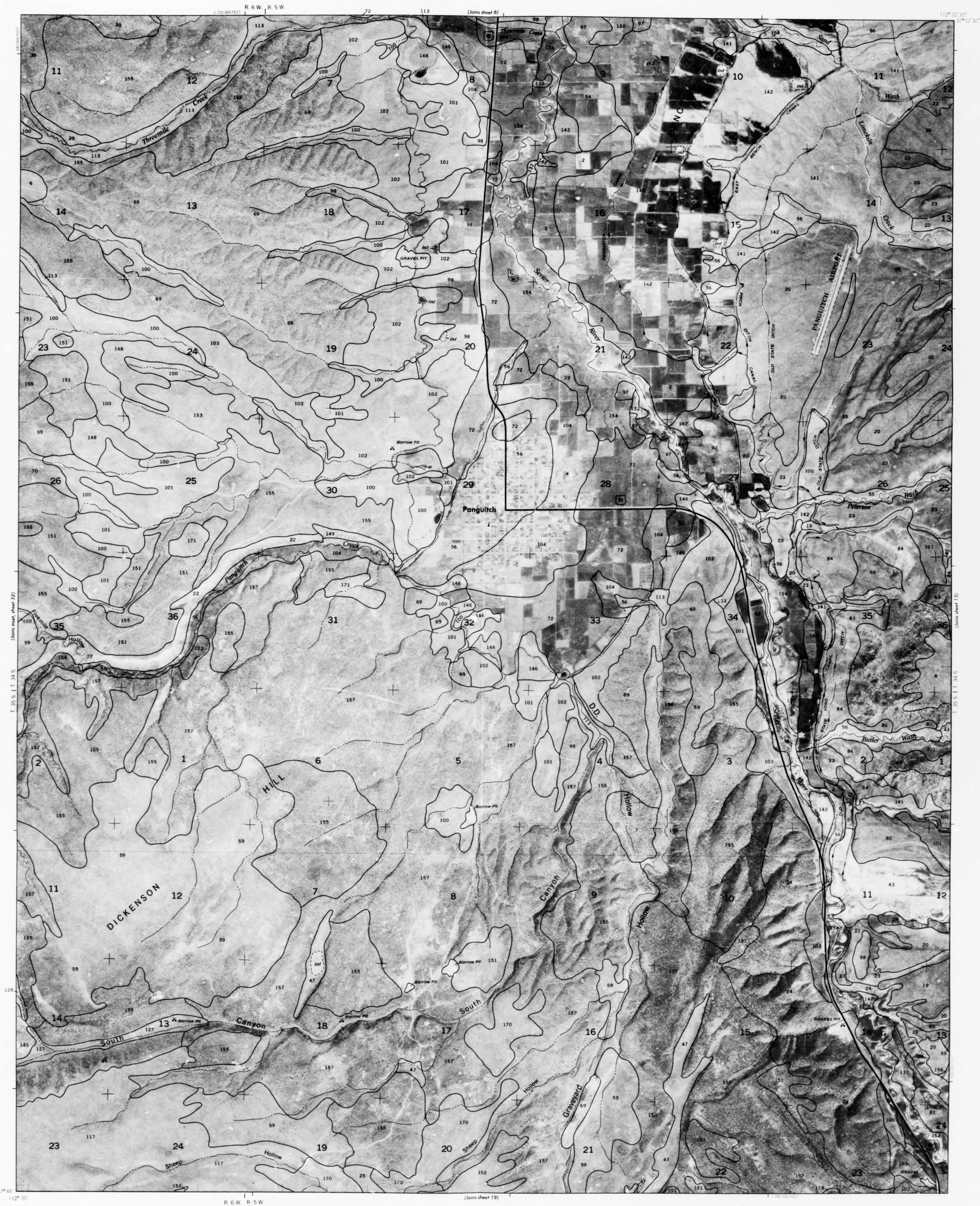
PANGUITCH AREA, UTAH NO. 11

A 57. 38:

SHEET NO. 11 OF 34

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 12
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N

PANGUITCH AREA, UTAH NO. 12

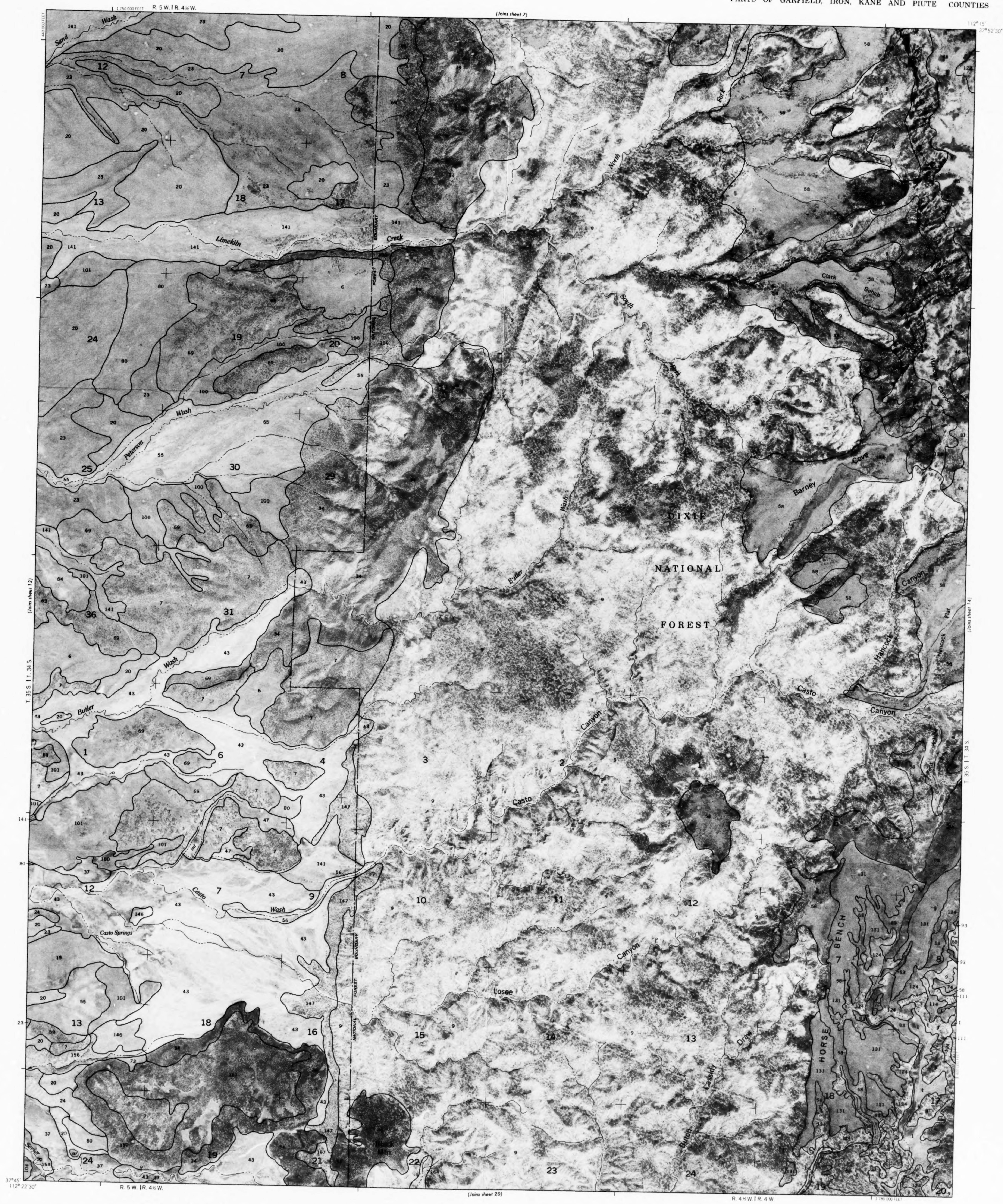
SHEET NO. 12 OF 34

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 13

SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

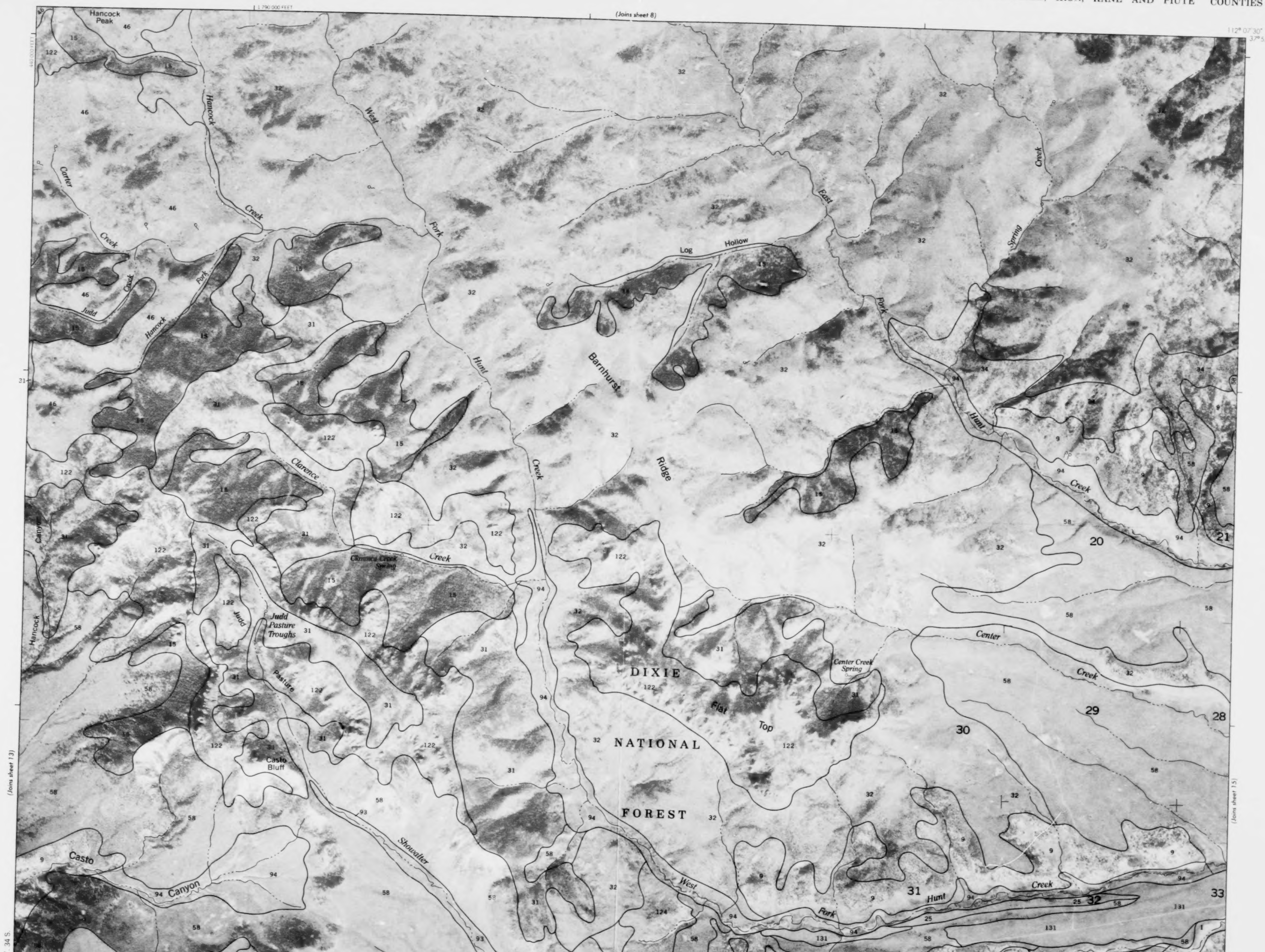
N

PANGUITCH AREA, UTAH NO. 13

A 57. 38.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 14
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

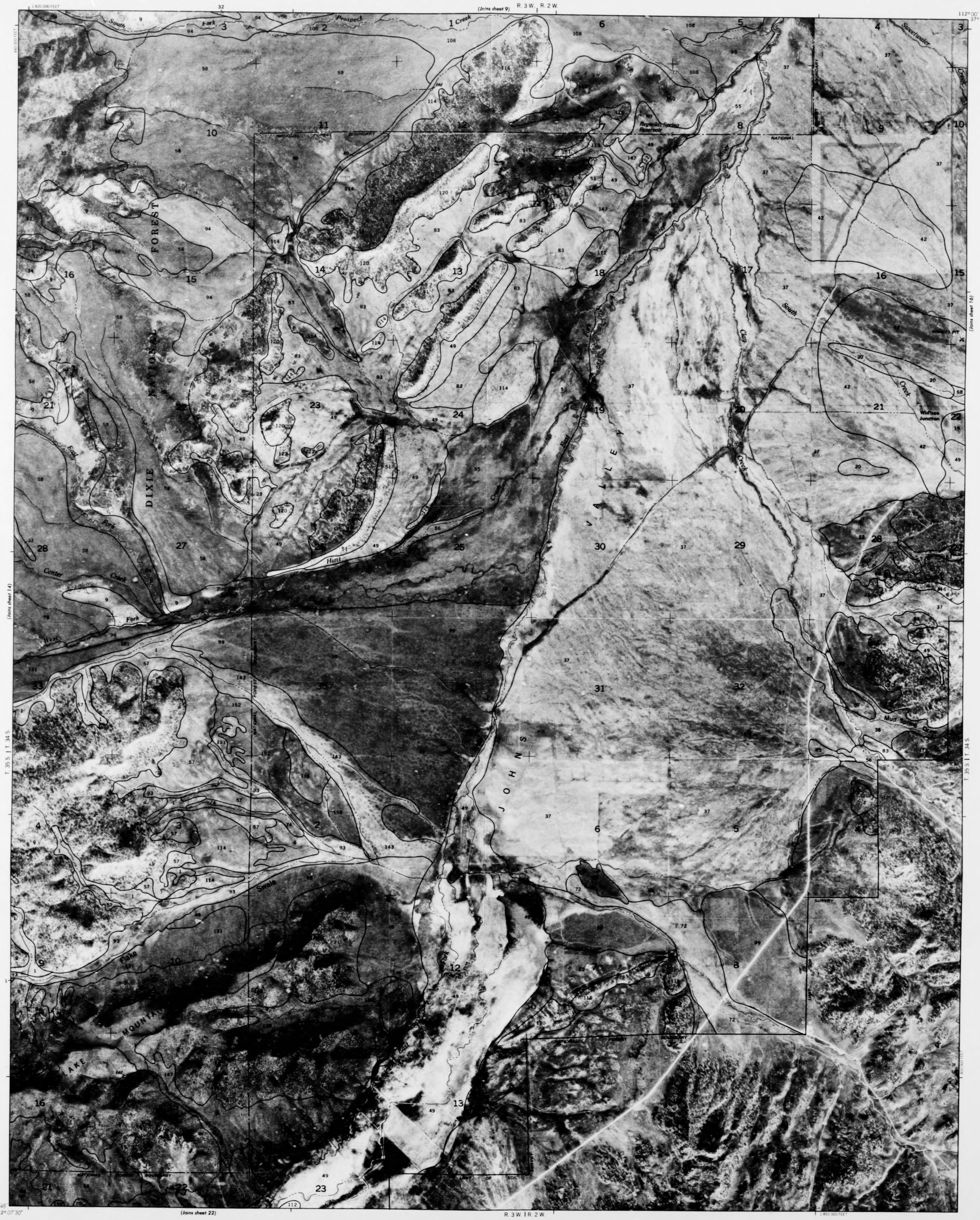
N

PANGUITCH AREA, UTAH NO. 14

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 15
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

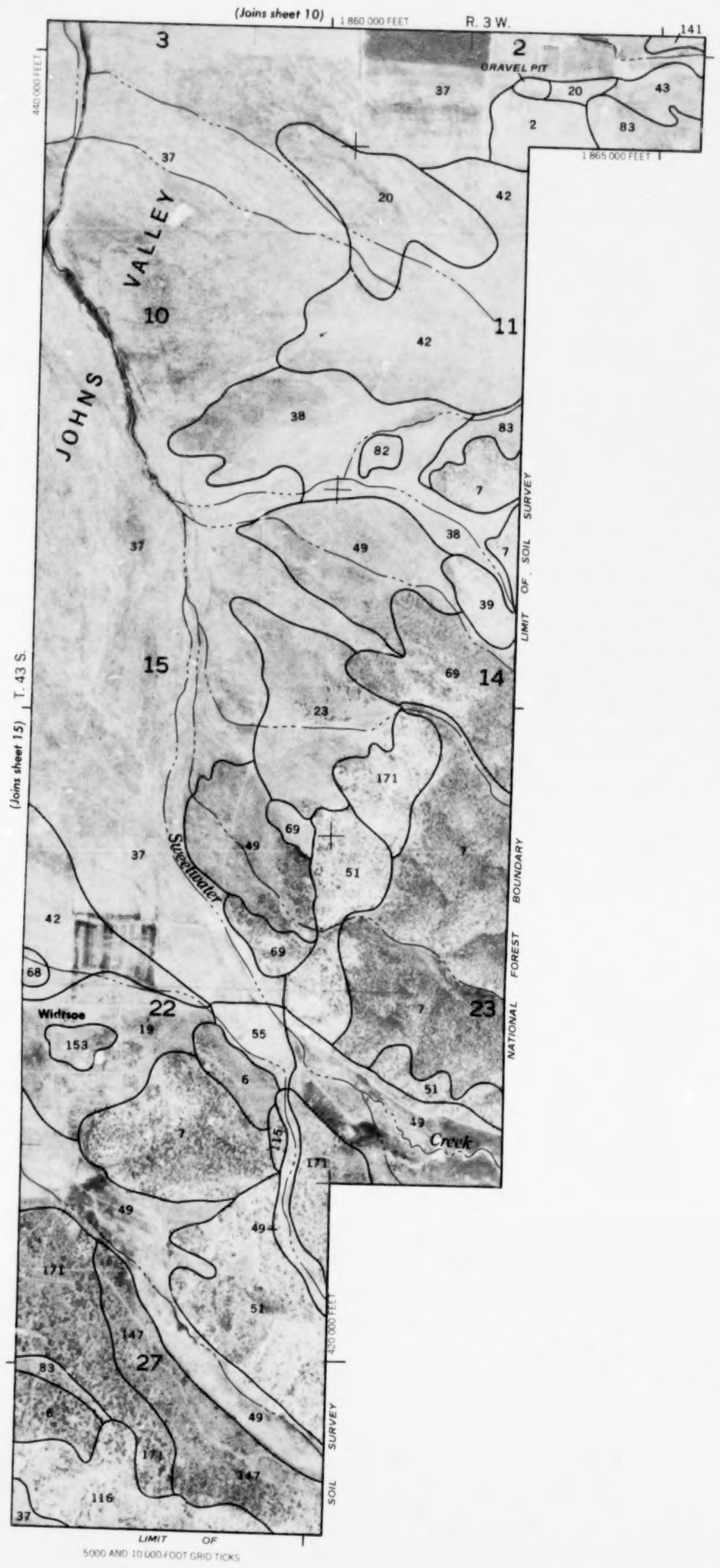
N

PANGUITCH AREA, UTAH NO. 15

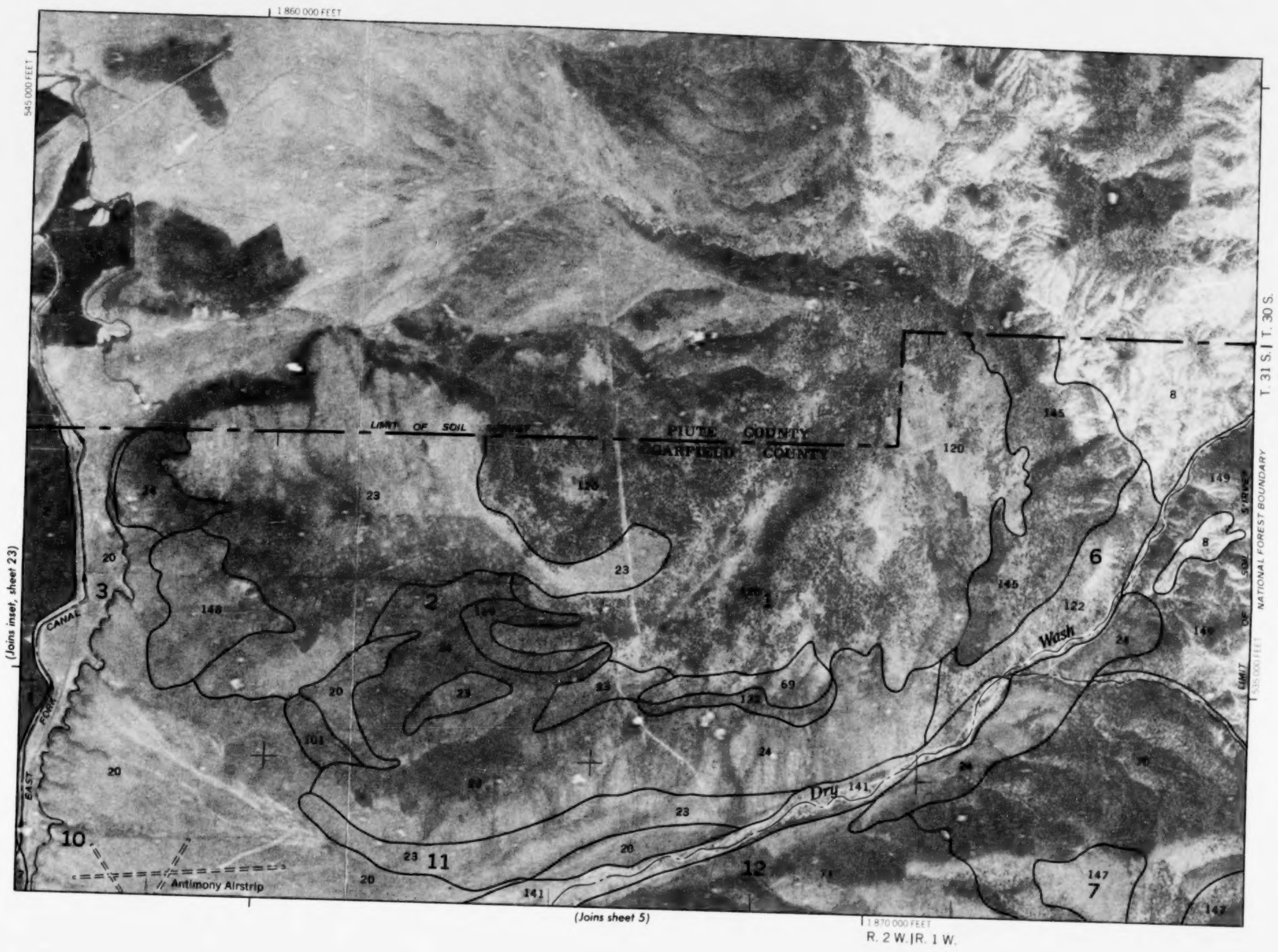
A 57.38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

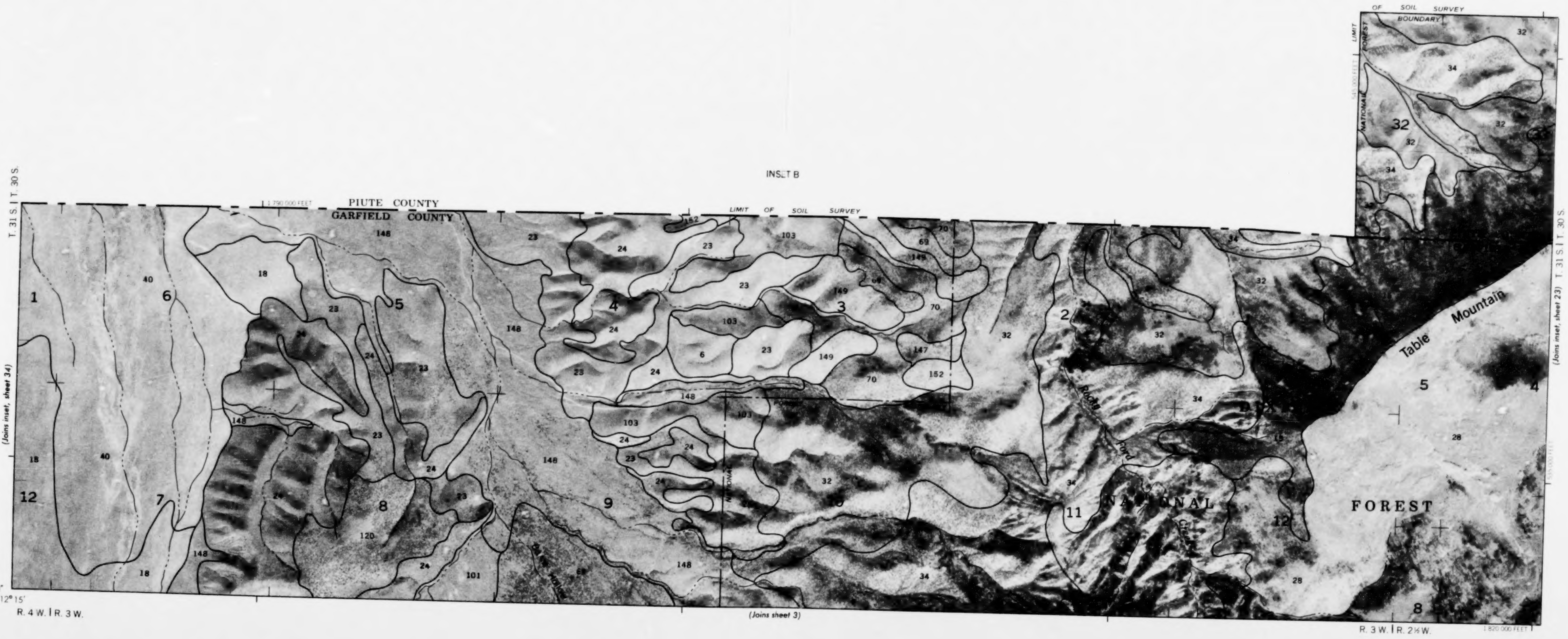
SHEET NO. 16
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



INSET A



INSET B



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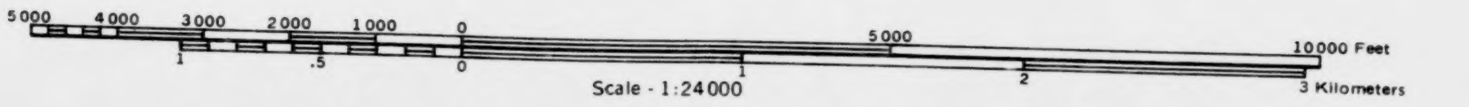


Scale - 1:24000

N

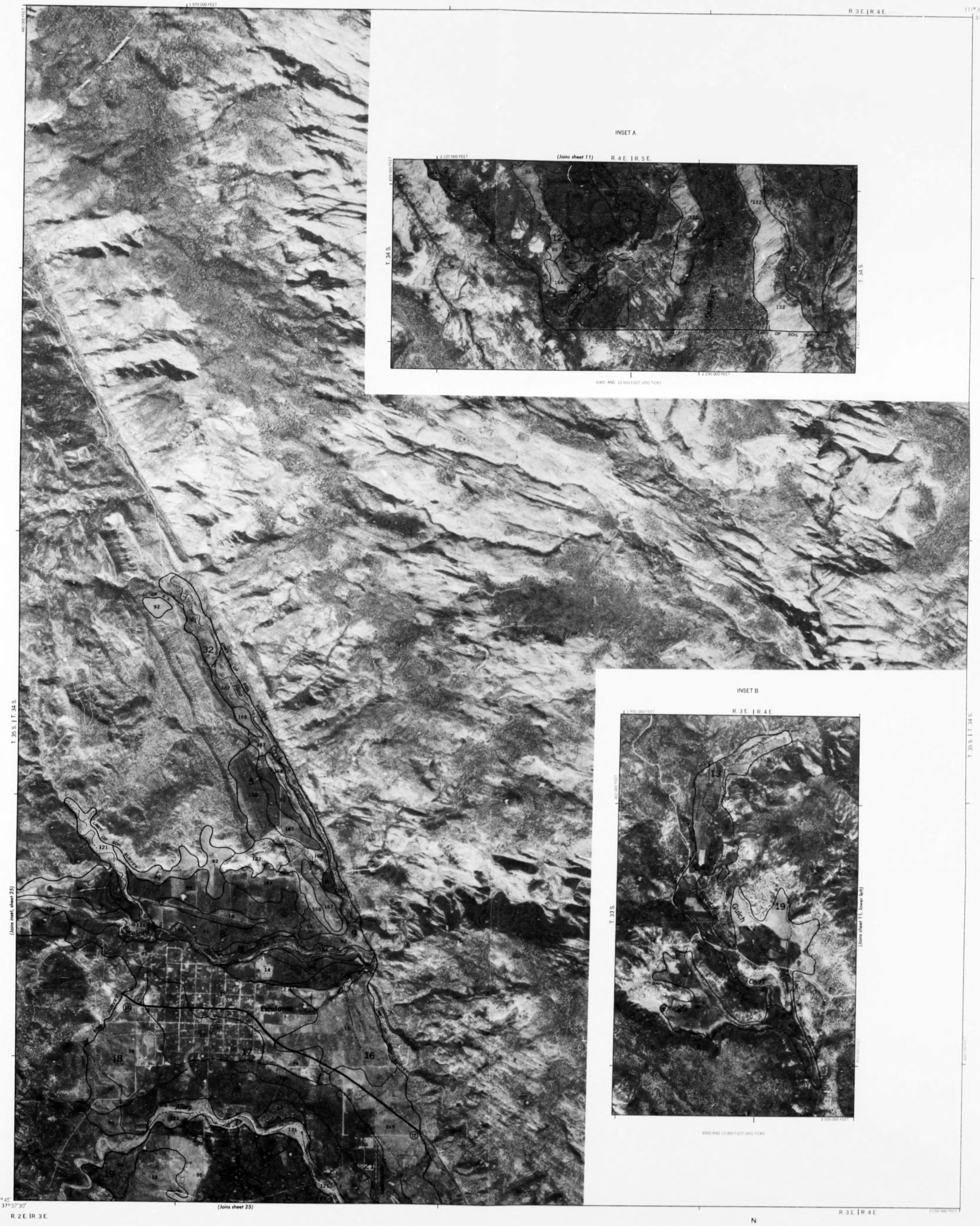
PANGUITCH AREA, UTAH NO. 16

SHEET NO. 16 OF 34

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 17
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers

Scale - 1:24000

N

PANGUITCH AREA, UTAH NO. 17

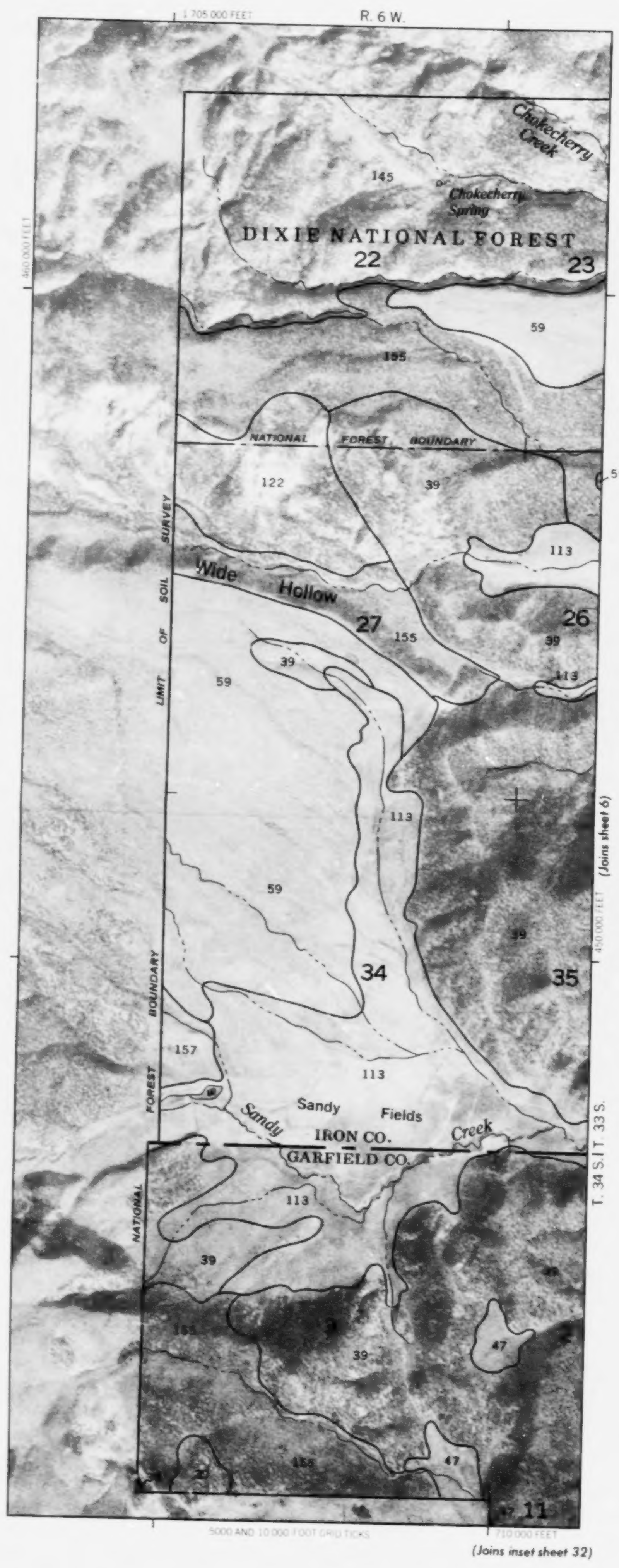
SHEET NO. 17 OF 34

A 57. 38:

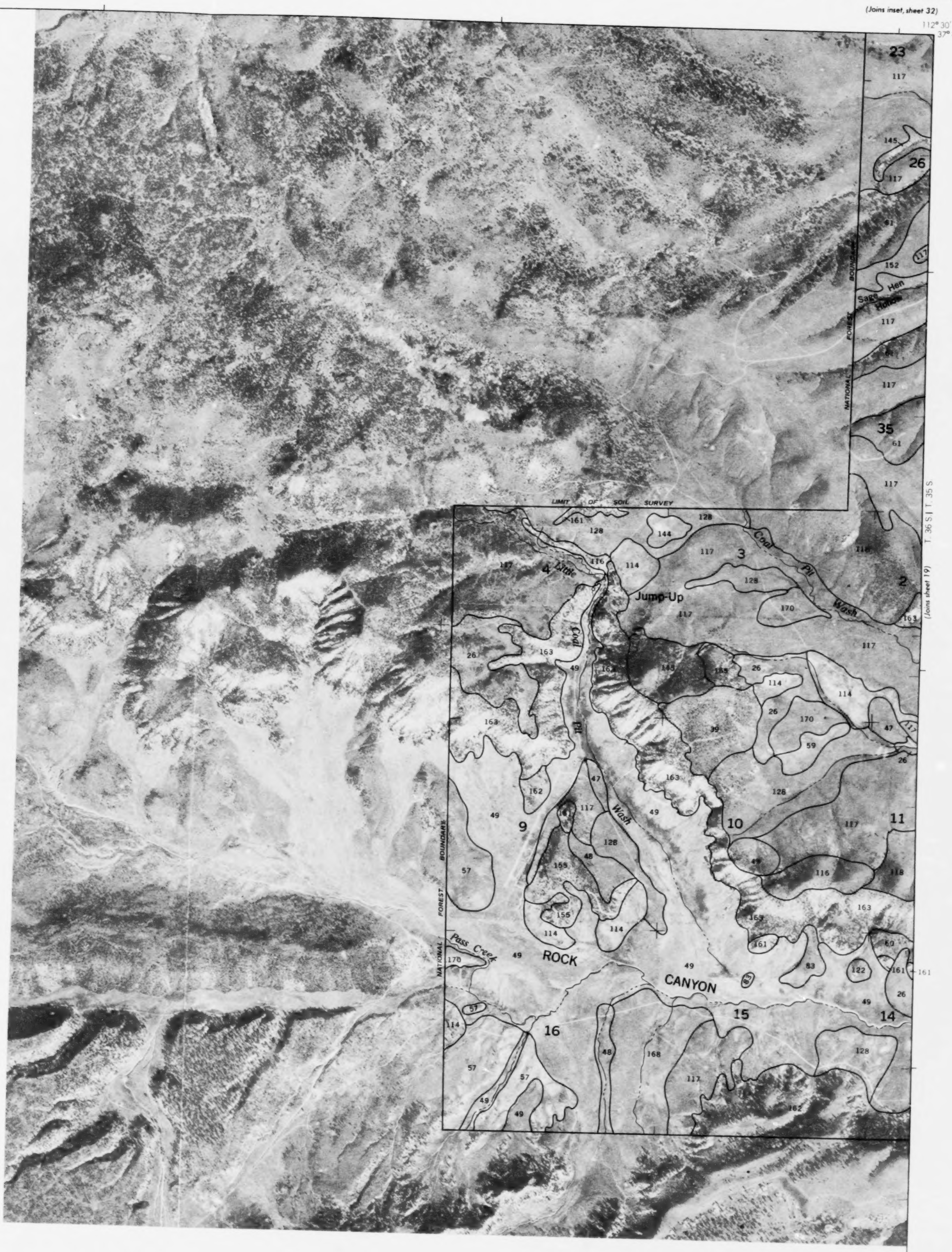
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 18
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES

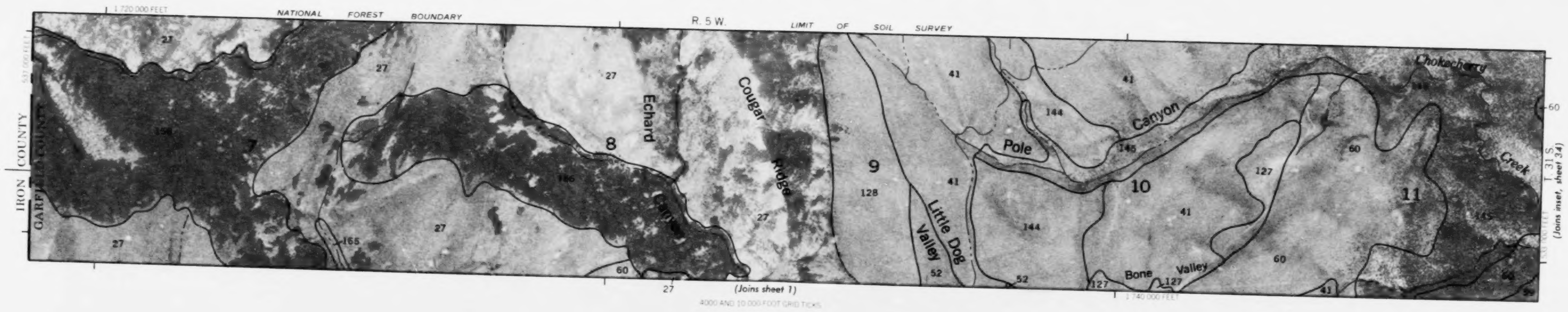
INSET A

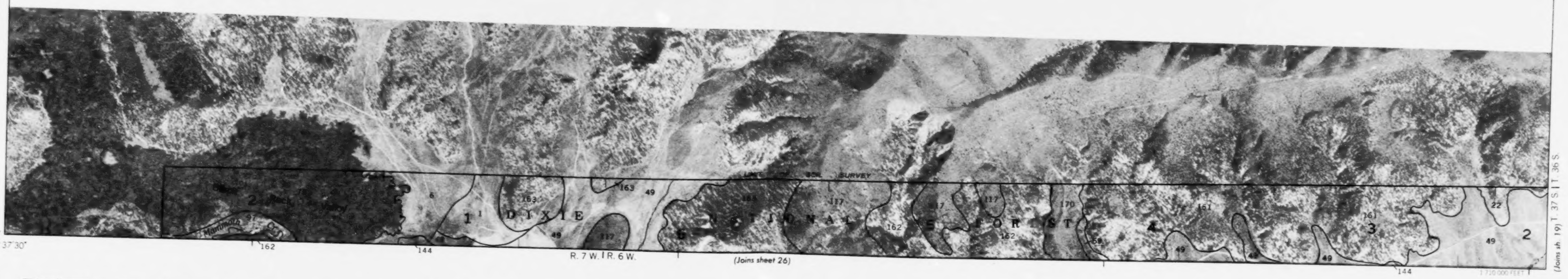


(Joins inset, sheet 32)



INSET B





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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 2 3 Kilometers
Scale - 1:24000

N

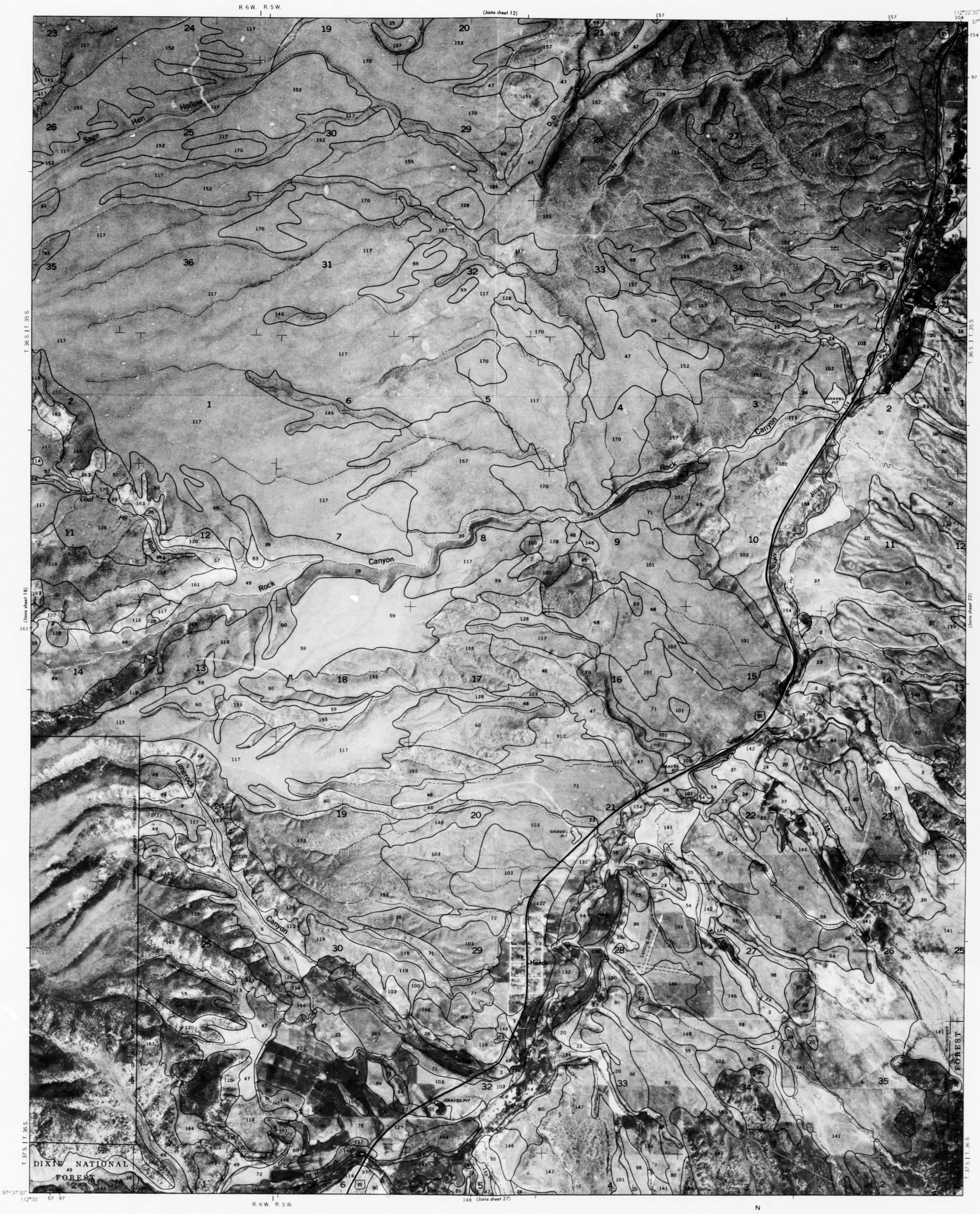
PANGUITCH AREA, UTAH NO. 18

SHEET NO. 18 OF 34

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 19
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

Scale - 1:24000

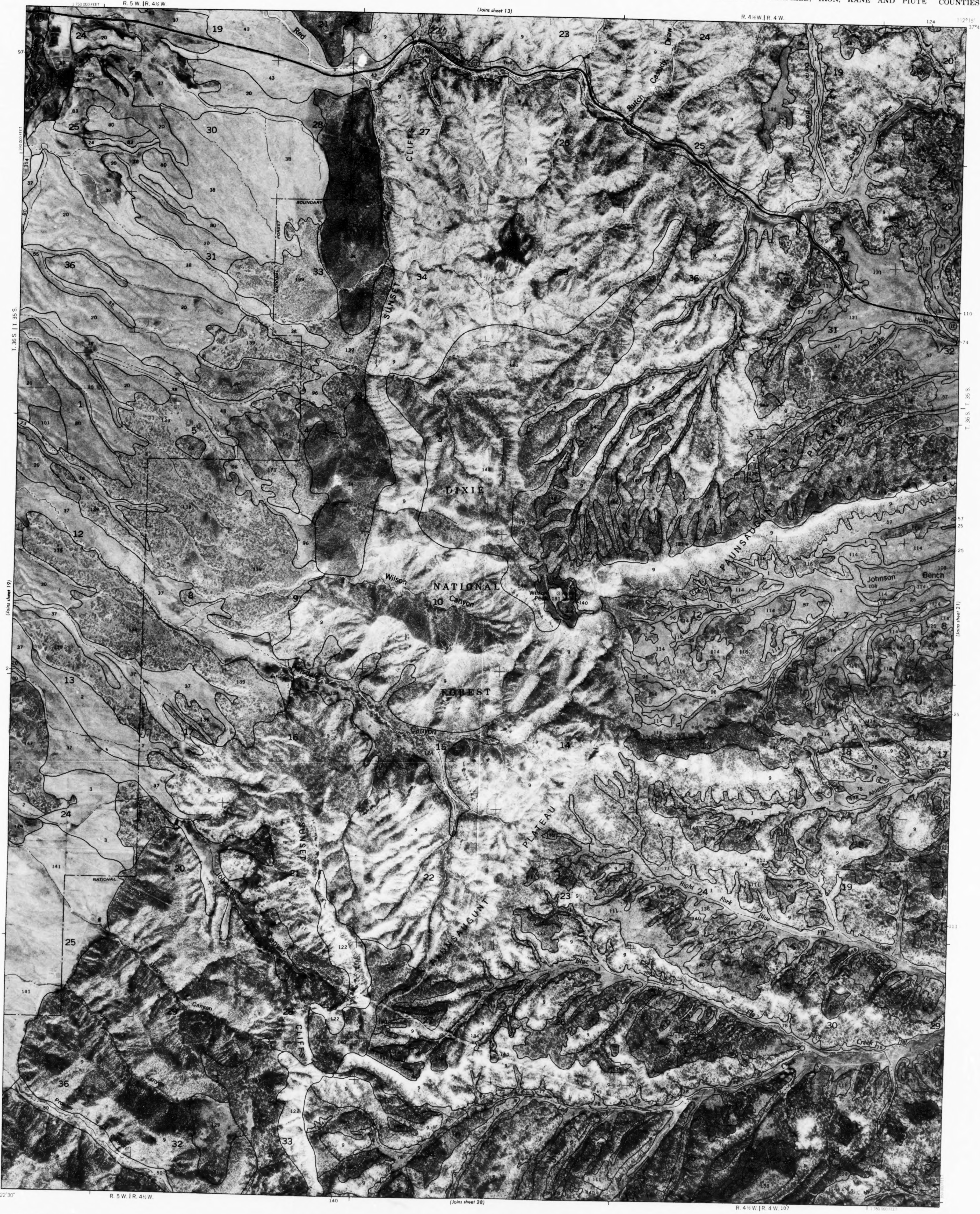
PANGUITCH AREA, UTAH NO. 19

SHEET NO.19 OF 34

A 57.38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 20
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

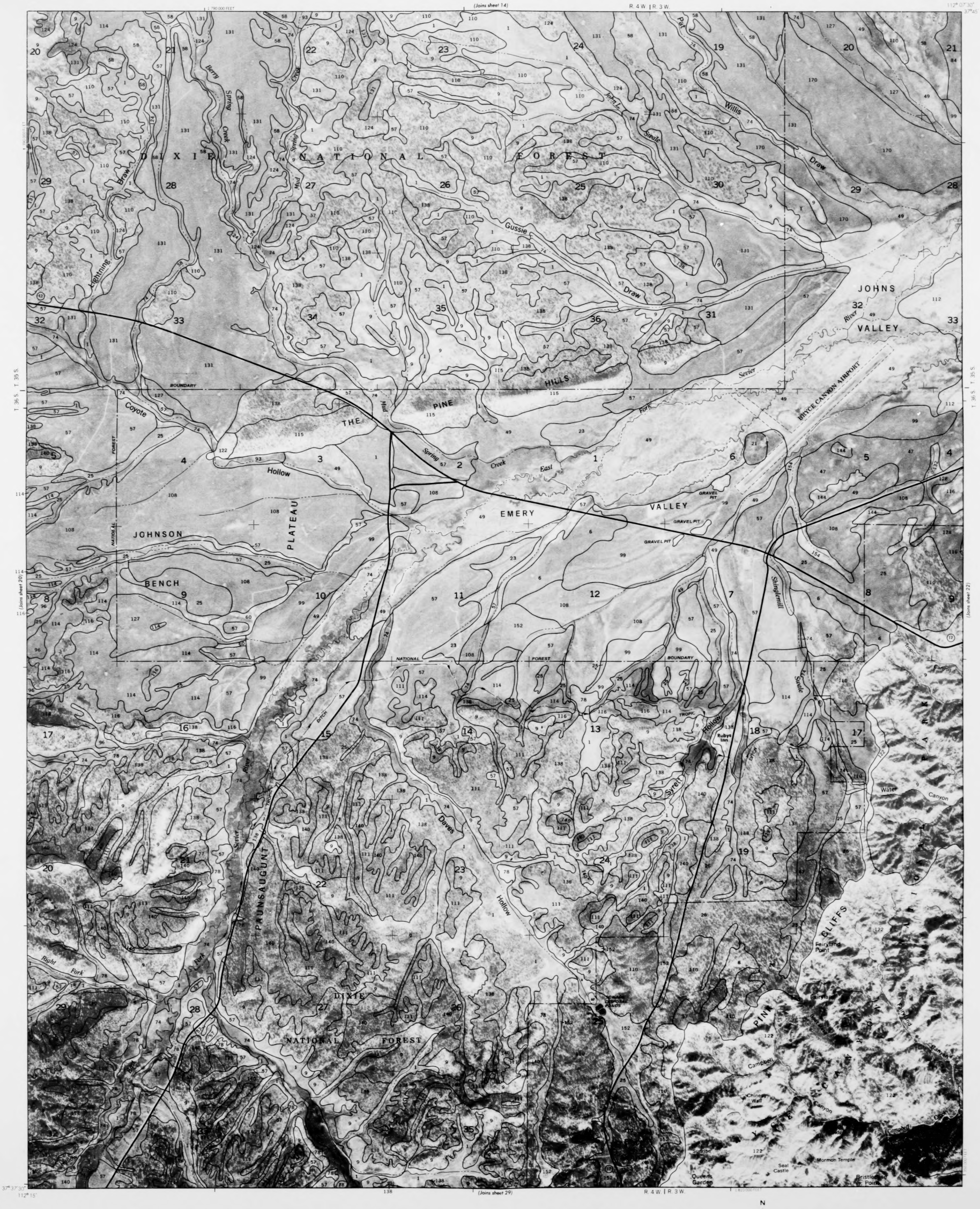
N

PANGUITCH AREA, UTAH NO. 20

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 21
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

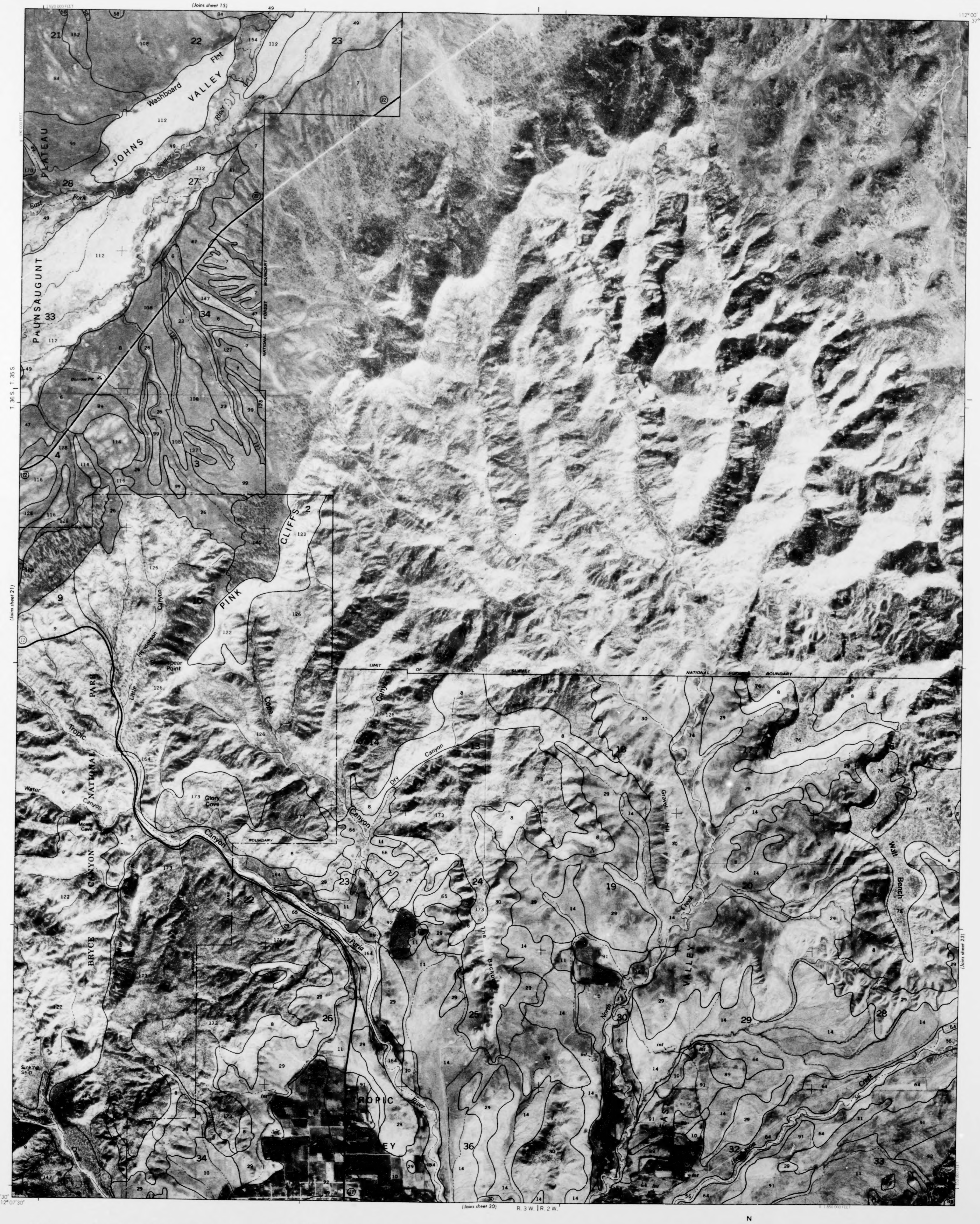
PANGUITCH AREA, UTAH NO. 21

SHEET NO. 21 OF 34

A 57. 38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 22
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

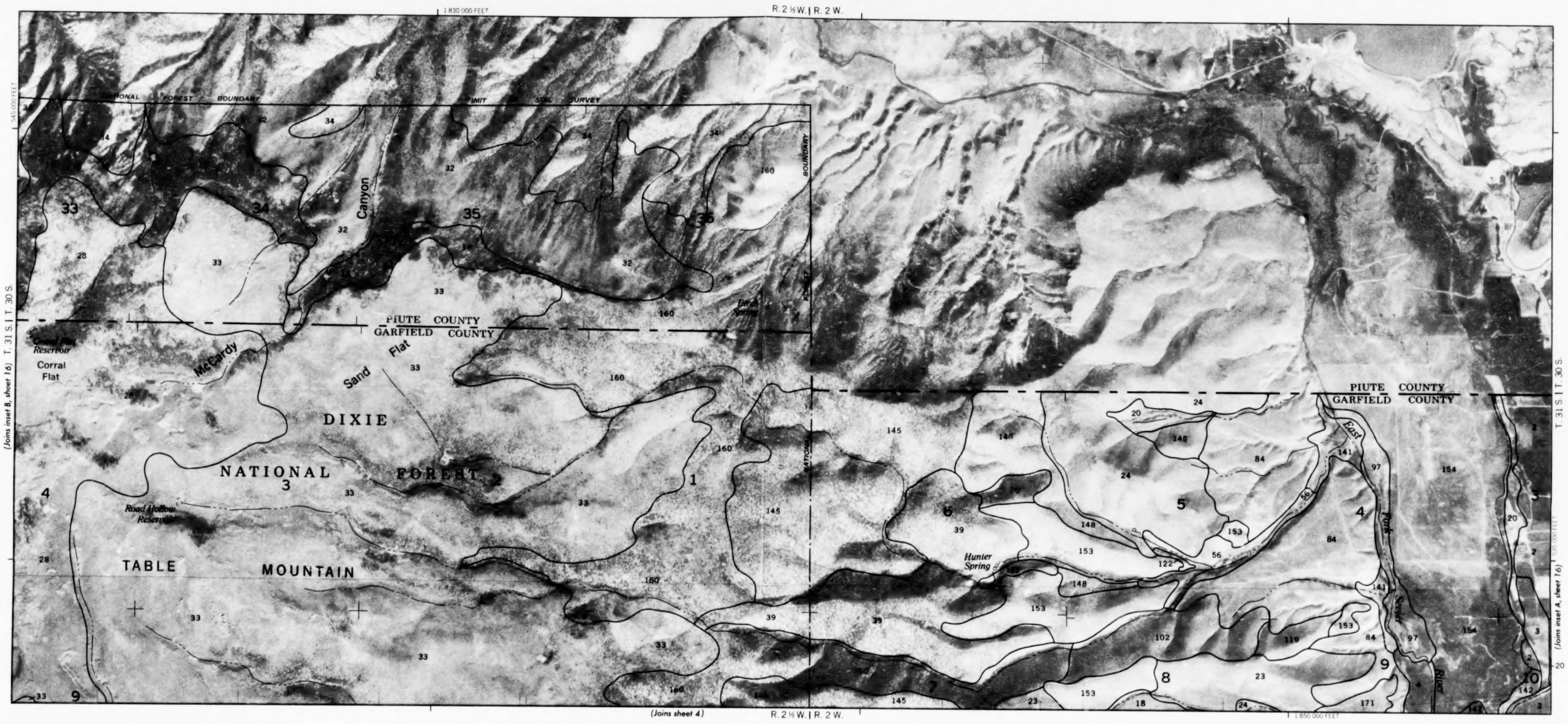
PANGUITCH AREA, UTAH NO. 22

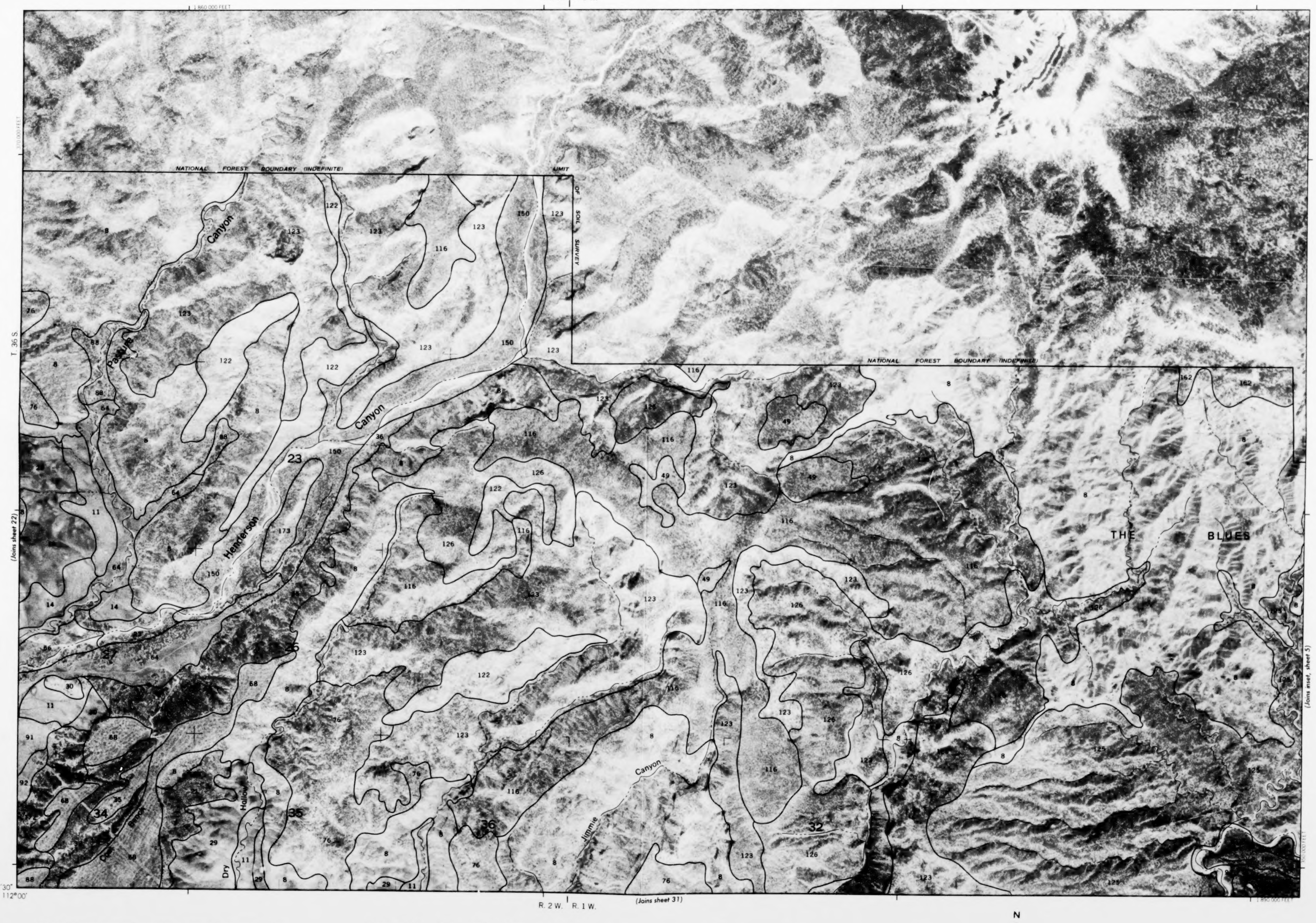
SHEET NO. 22 OF 34

P 19/4

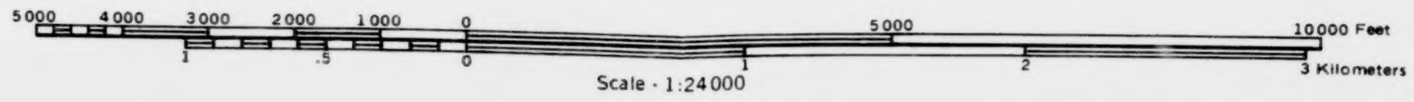
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 23
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES





This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



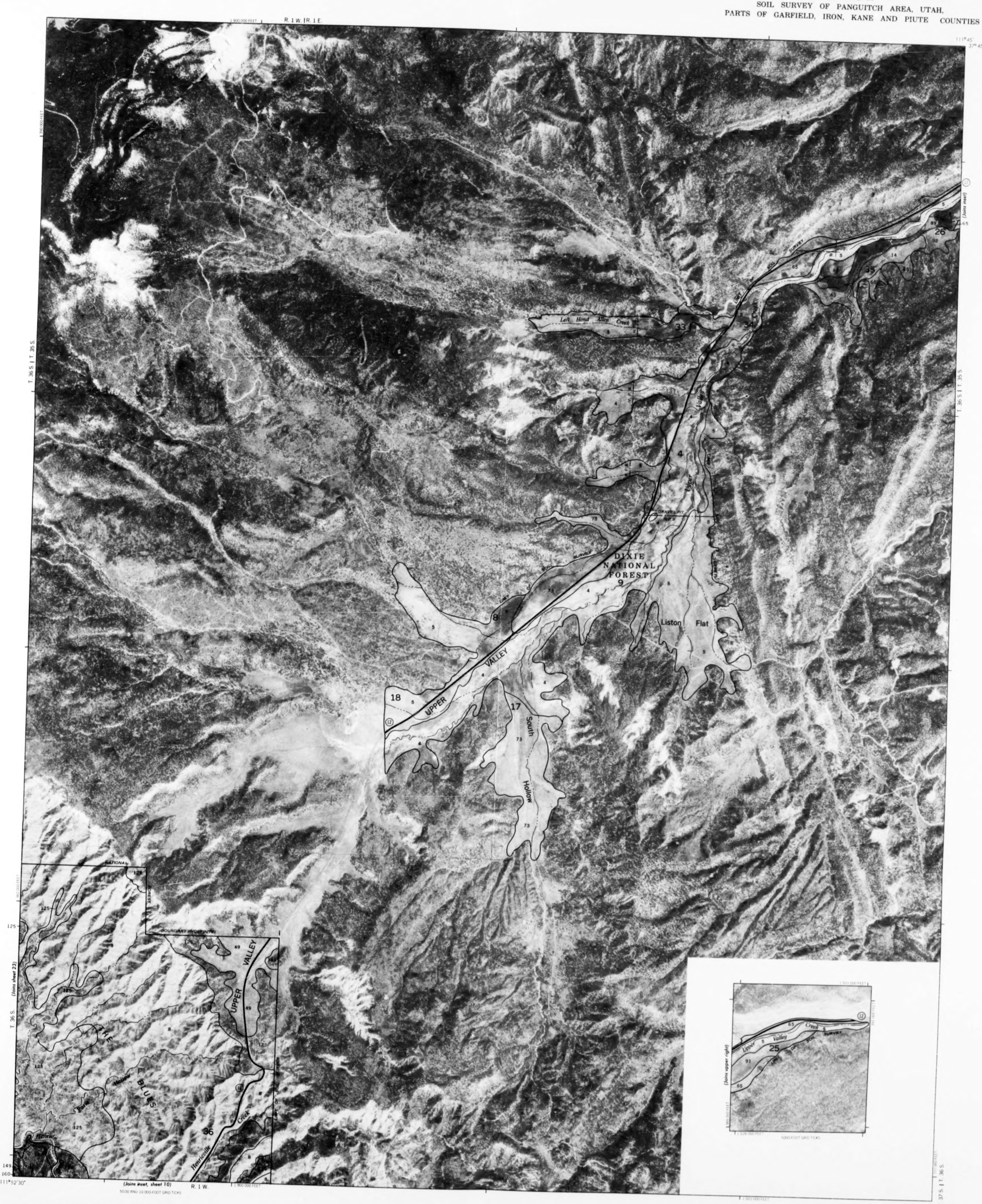
Scale - 1:24 000

PANGUITCH AREA, UTAH NO. 23

A 57.38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 24
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

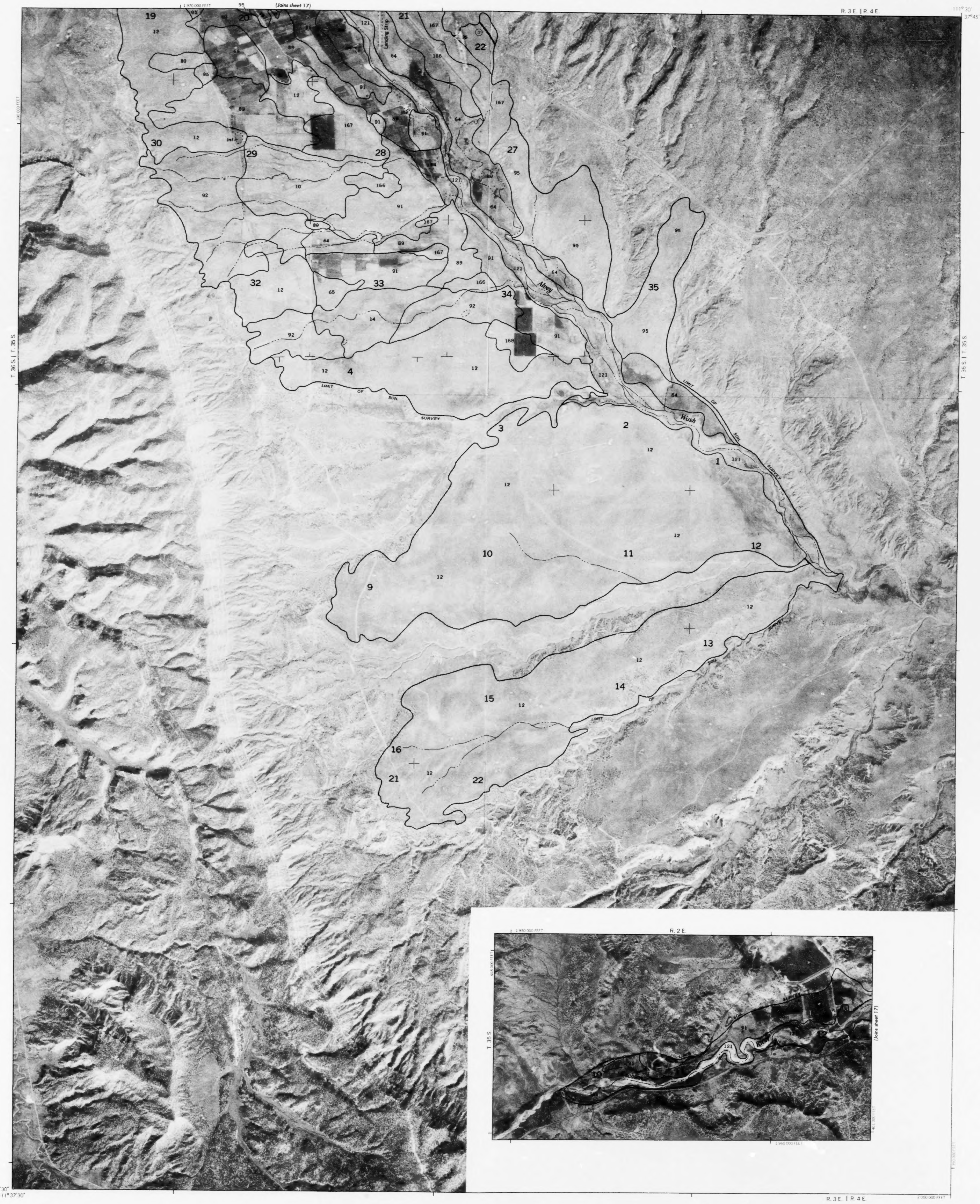
N

PANGUITCH AREA, UTAH NO. 24

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 25
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES

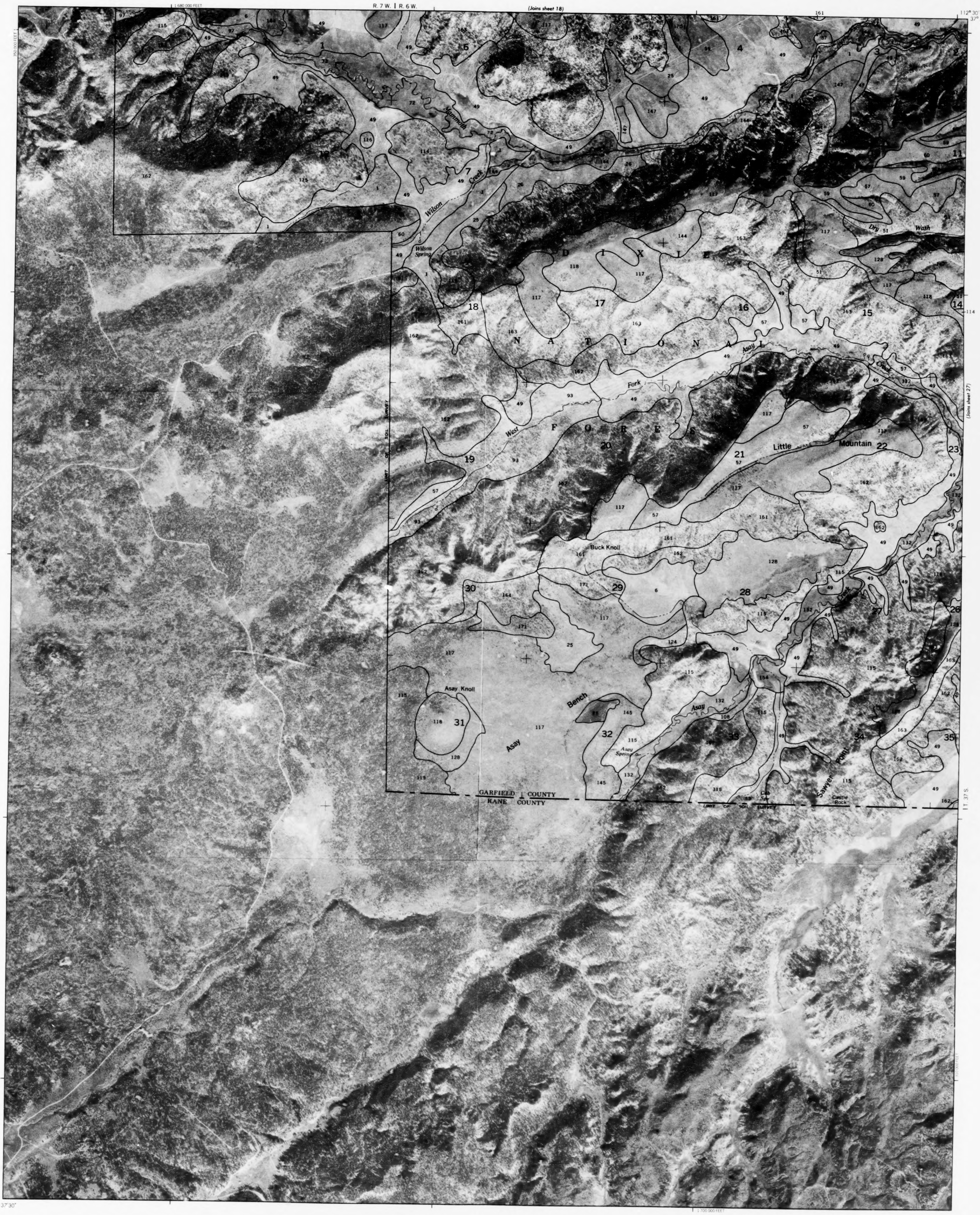


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

A 57. 38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 26
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

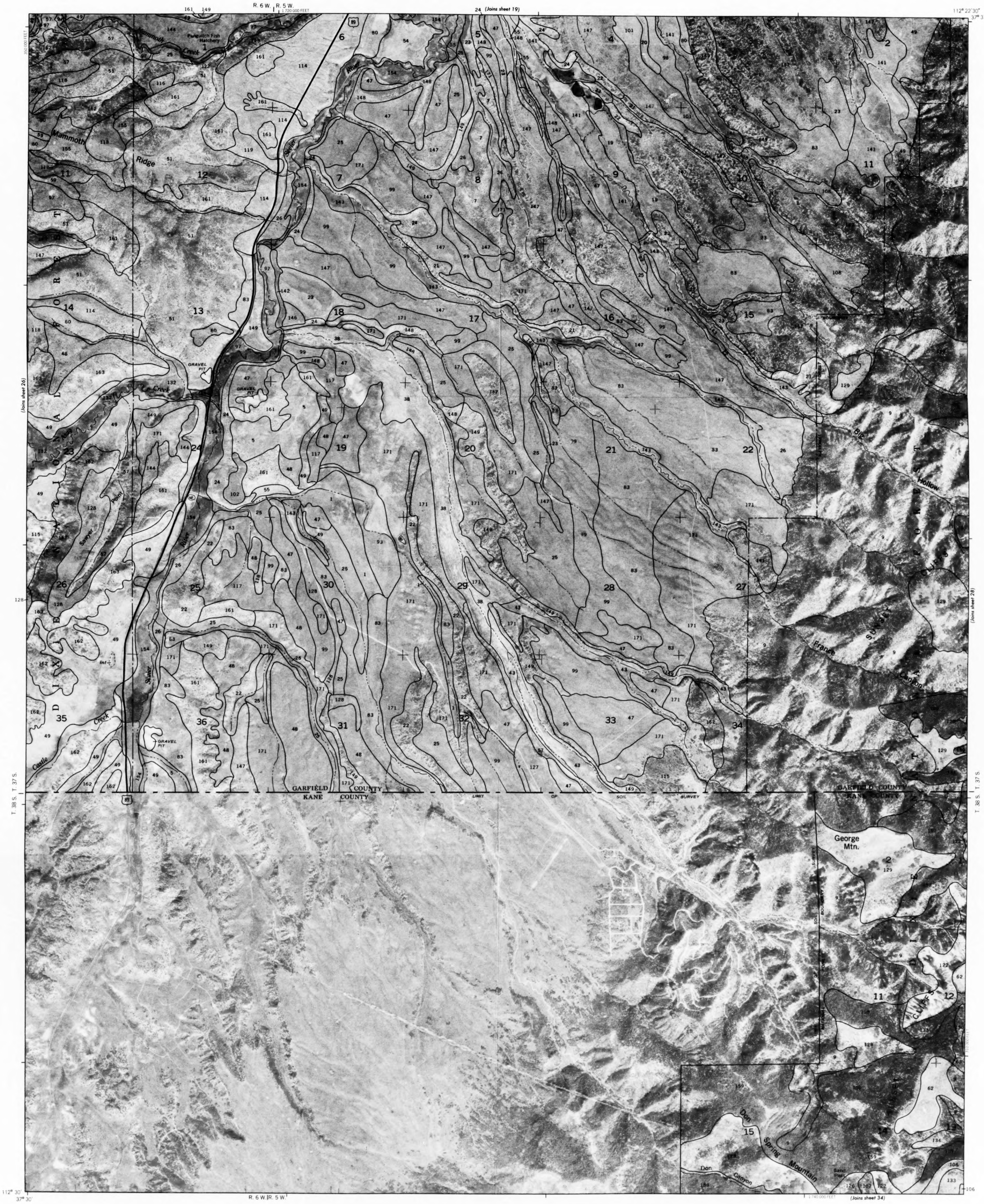
PANGUITCH AREA, UTAH NO. 26

SHEET NO. 26 OF 34

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 27
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



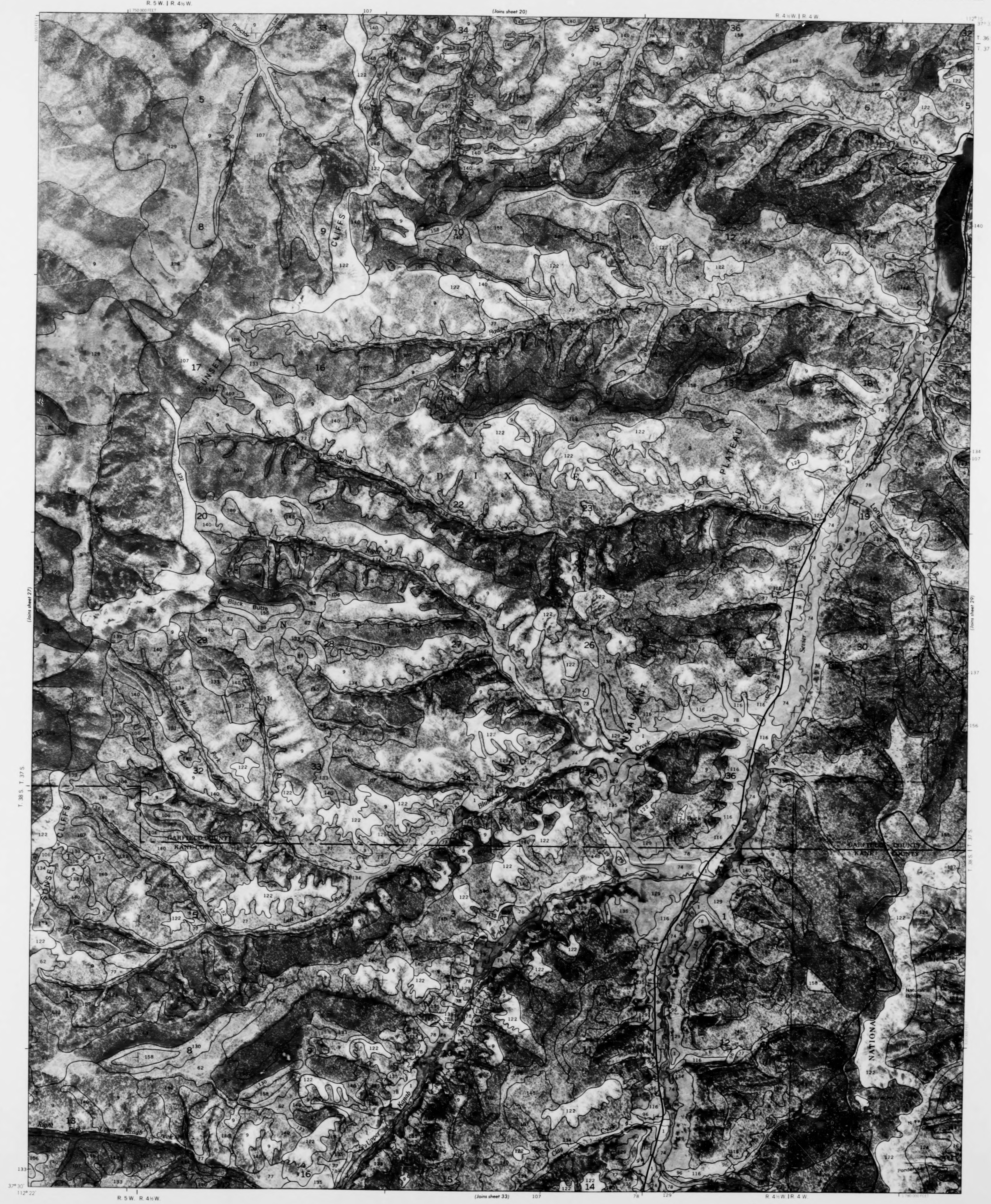
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PANGUITCH AREA, UTAH NO. 27

A57.38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 28
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers

Scale - 1:24000

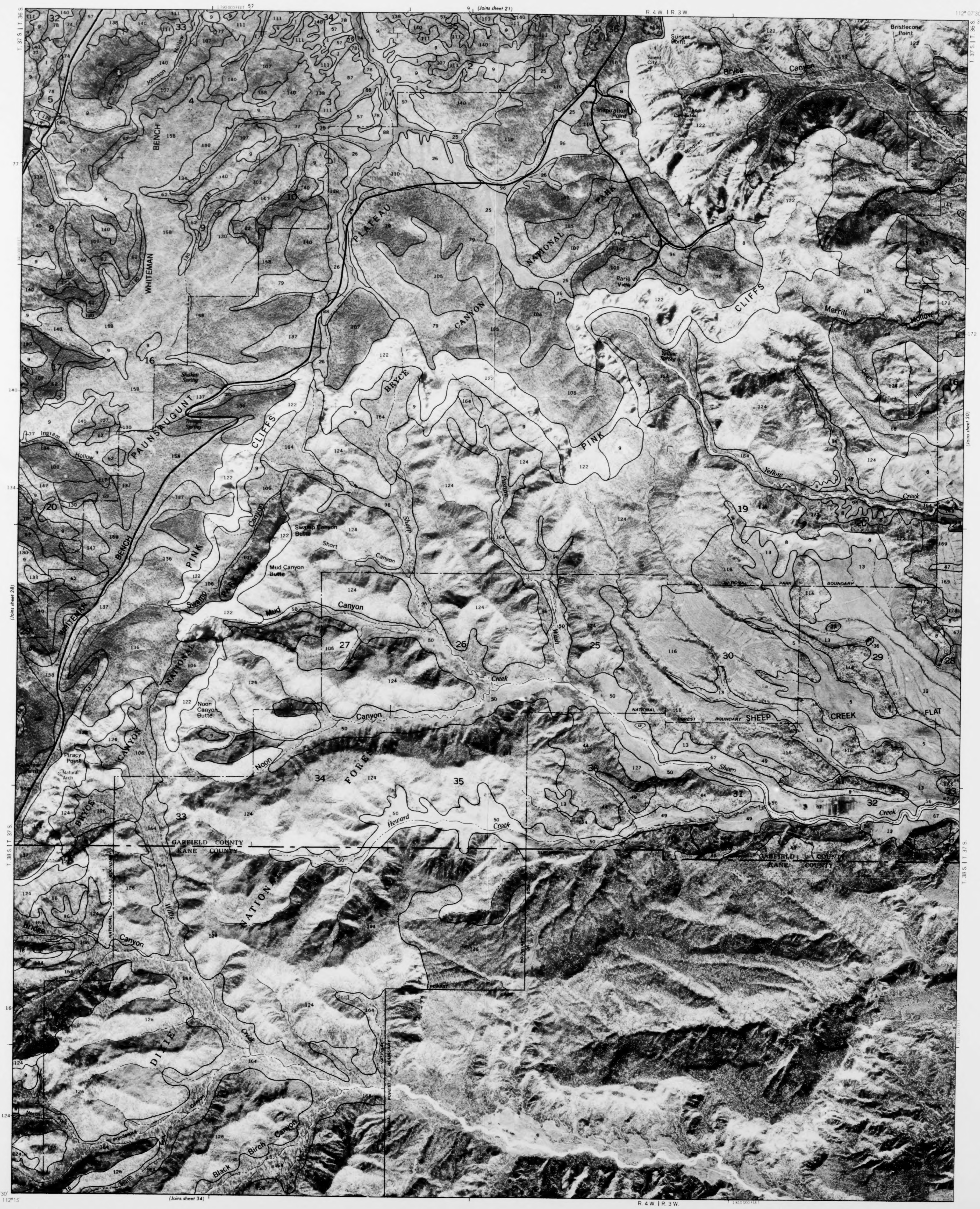
N

PANGUITCH AREA, UTAH NO. 28

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 29
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

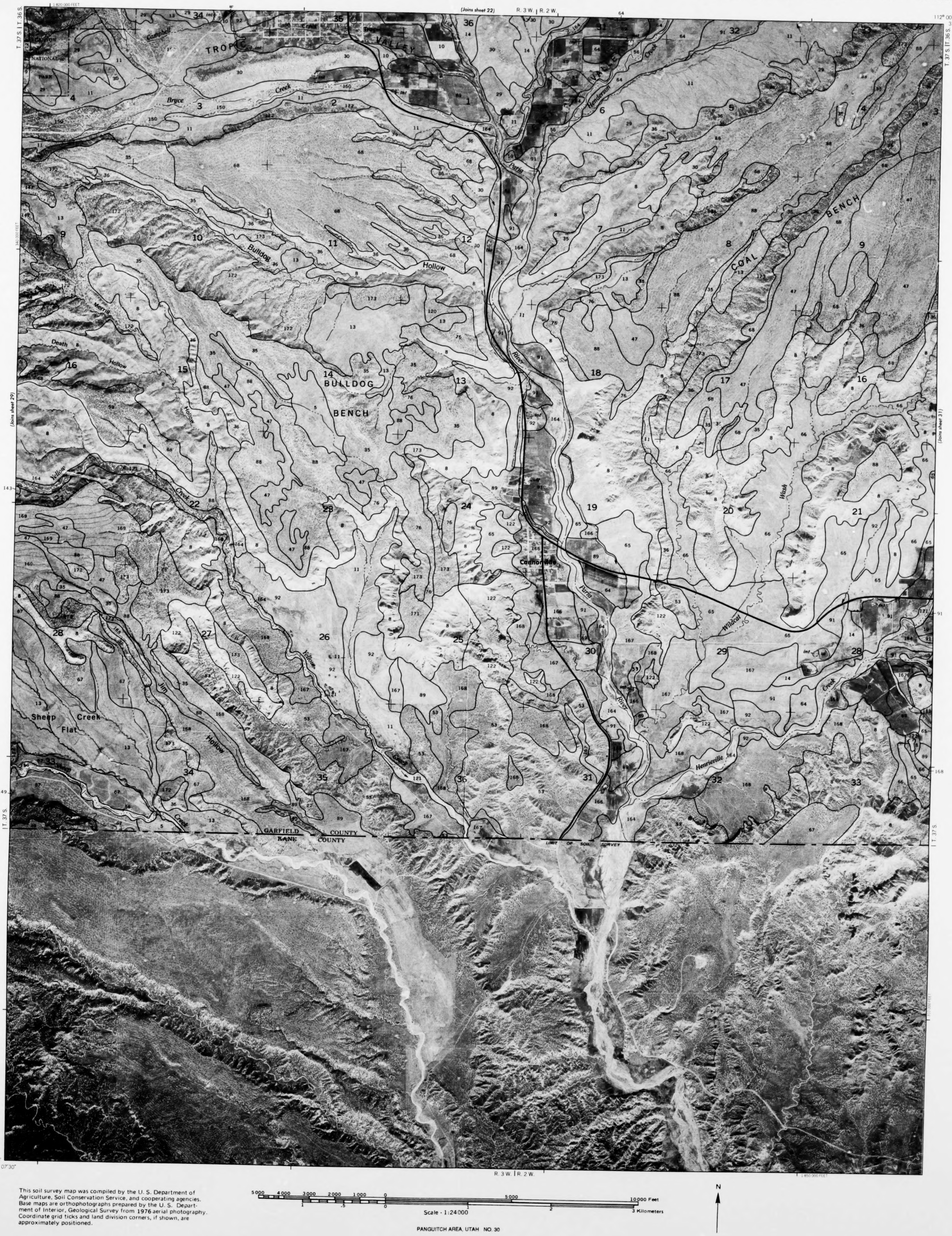
N

PANGUITCH AREA, UTAH NO. 29

SHEET NO. 29 OF 34

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 30
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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PANGUITCH AREA, UTAH NO. 30

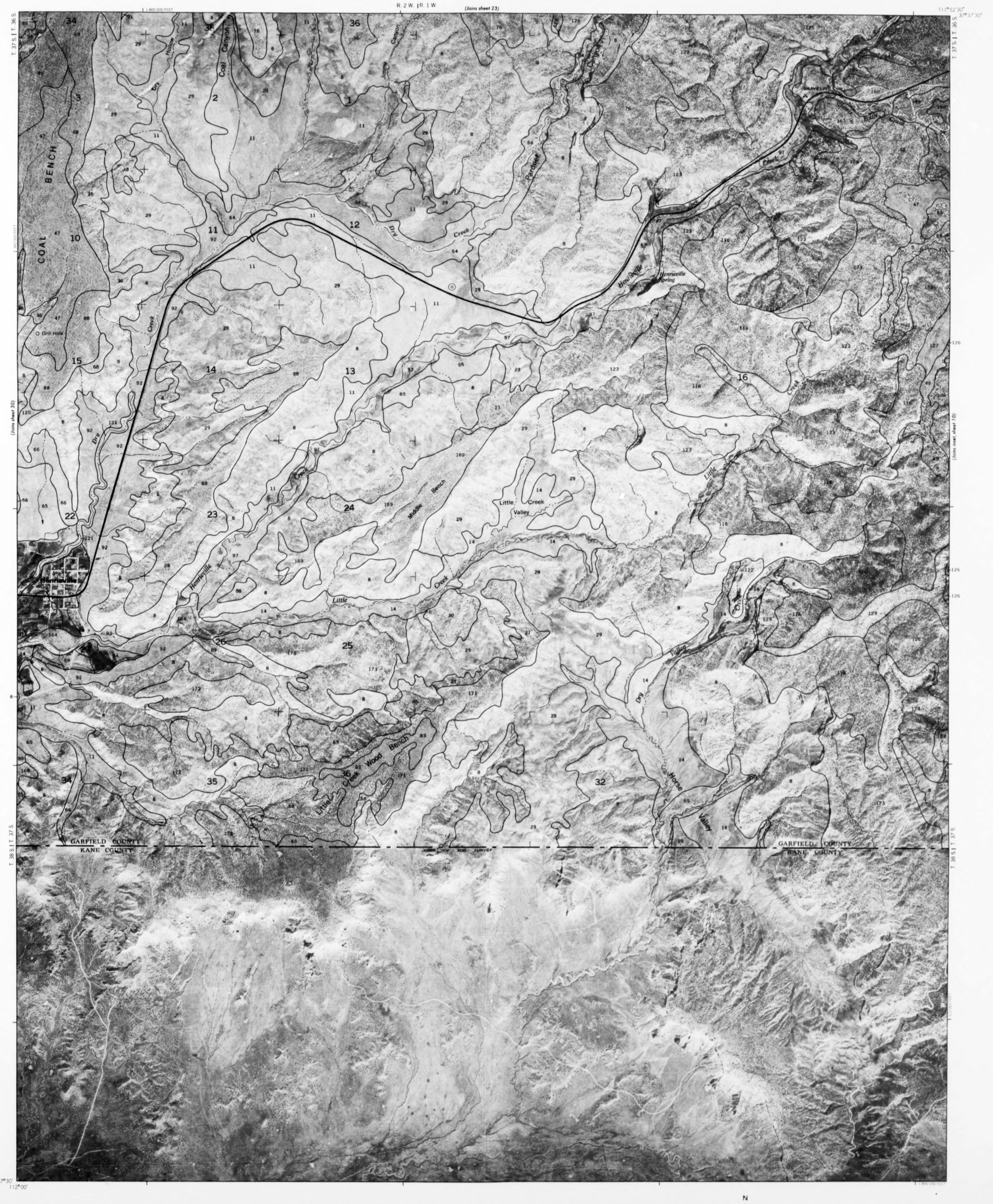
A 57.38:

SHEET NO. 30 OF 34

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 31
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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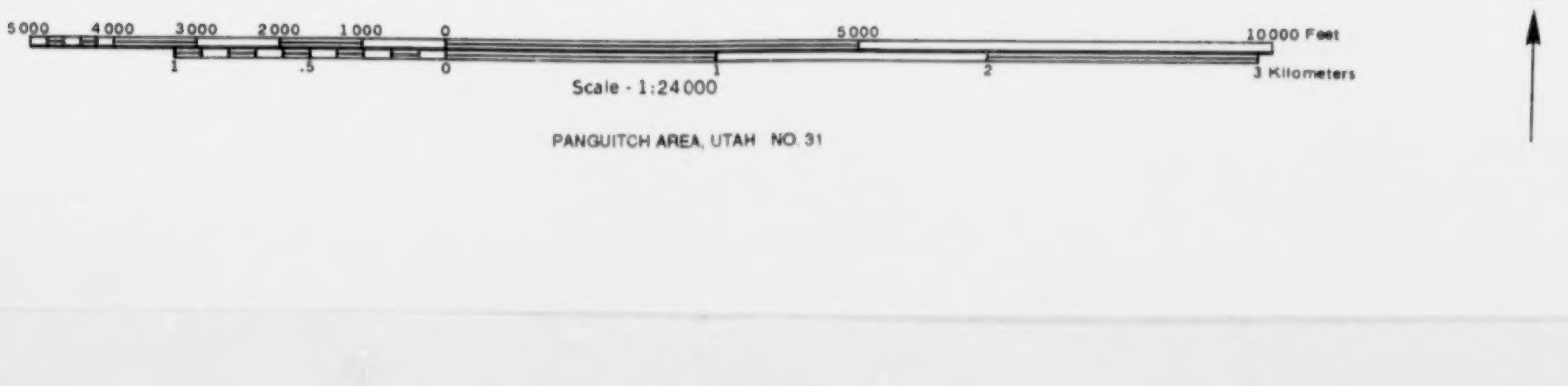


Scale - 1:24000

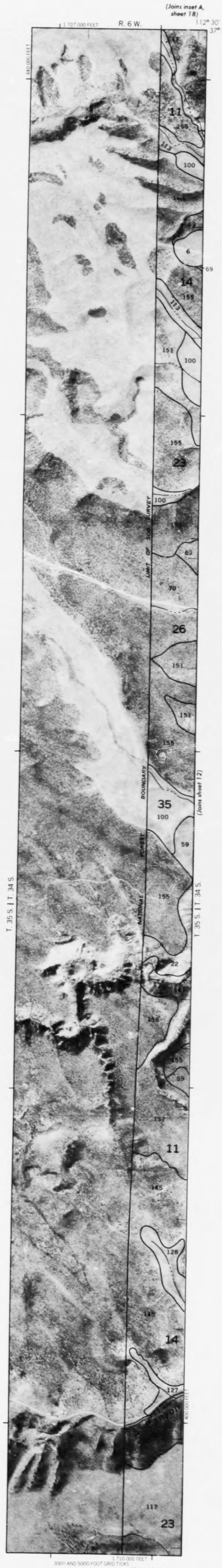
PANGUITCH AREA, UTAH NO. 31

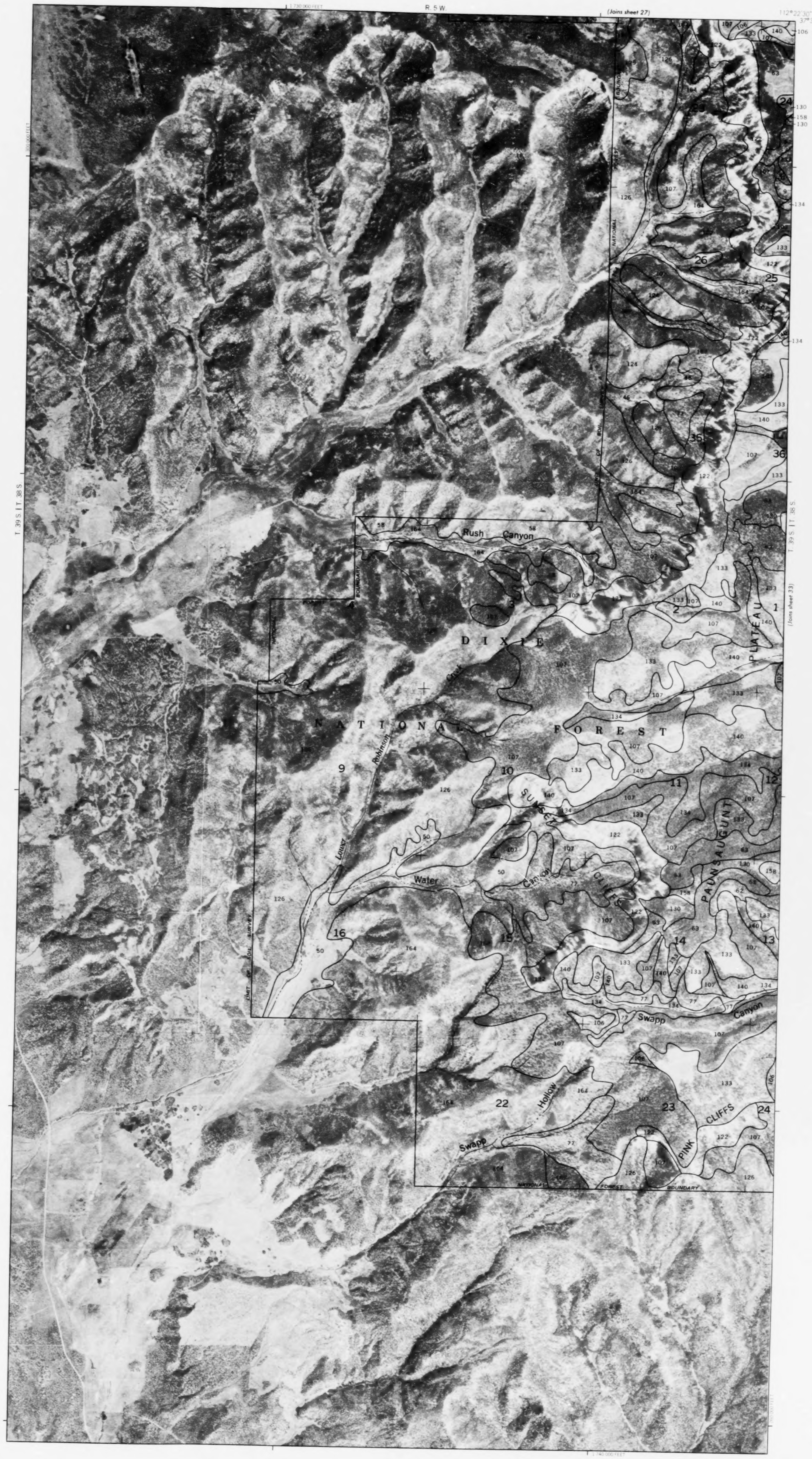
SHEET NO. 31 OF 34

A 57. 38:

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 32
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES





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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

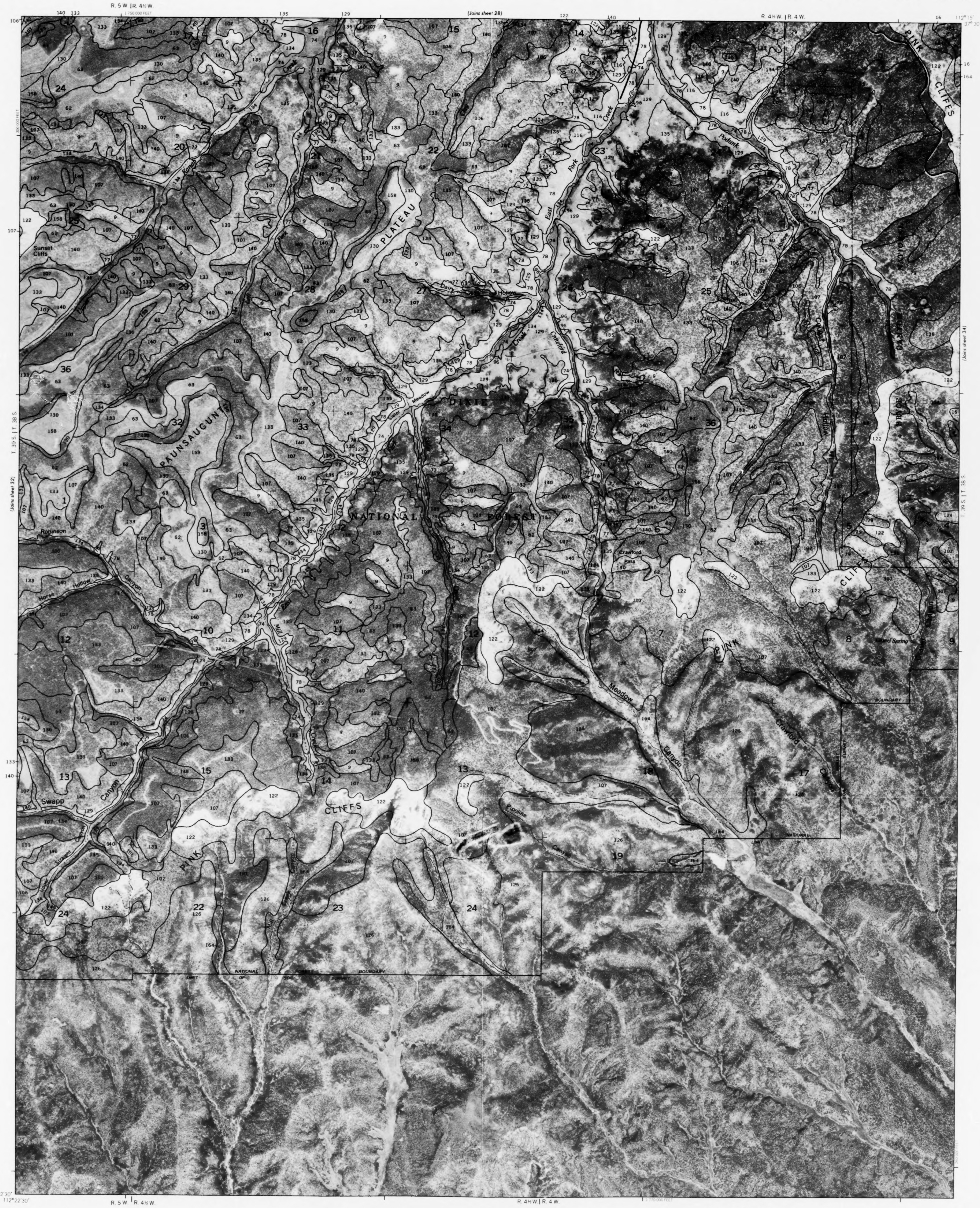
N

PANGUITCH AREA, UTAH NO. 32

P 19/4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 33
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES



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5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale - 1:24000

1 .5 0 1 2 3 Kilometers

N

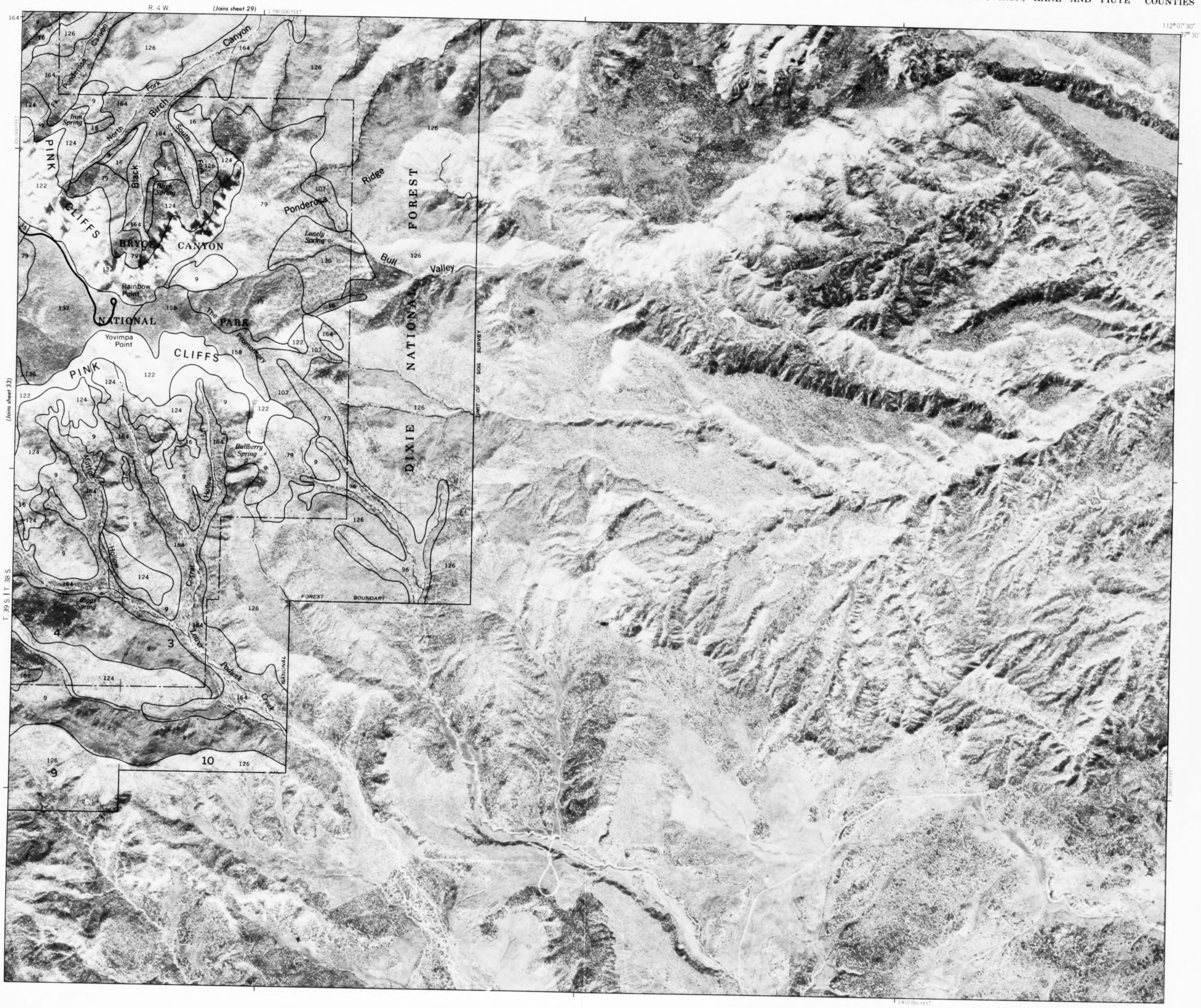
PANGUITCH AREA, UTAH NO. 33

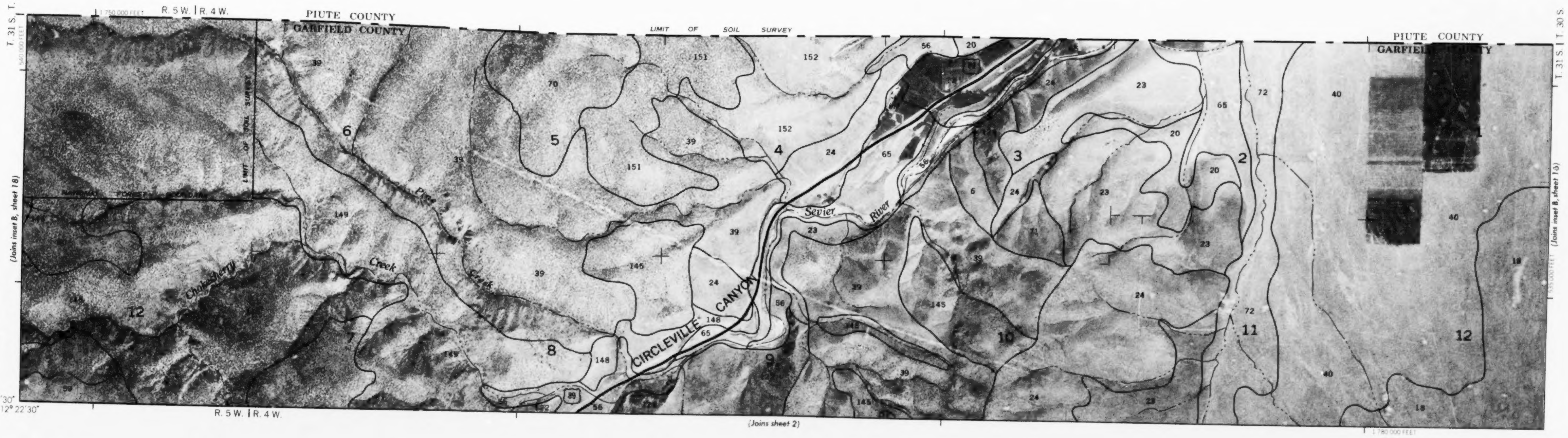
SHEET NO. 33 OF 34

A 57.38

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 34
SOIL SURVEY OF PANGUITCH AREA, UTAH,
PARTS OF GARFIELD, IRON, KANE AND PIUTE COUNTIES





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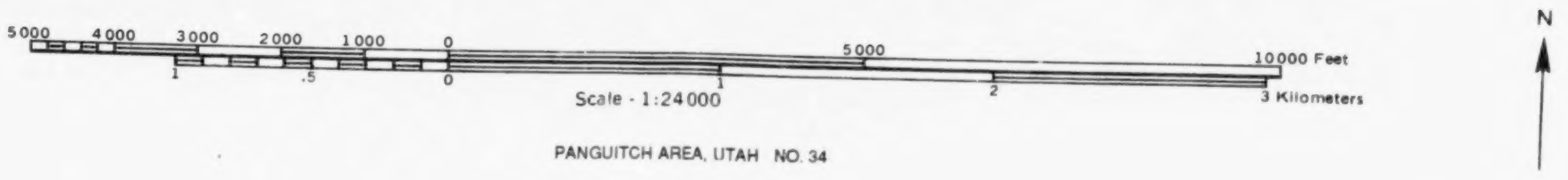

Scale - 1:24000

PANGUITCH AREA, UTAH NO. 34